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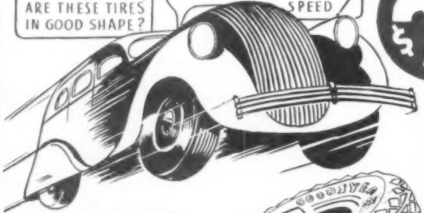

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OCTOBER
1934

Volume XII
Number 6

CONTENTS

SPECIAL FEATURES

Uncle Sam's Secret Tunnel System - - 34
By William Jennings

Water Forces Black Gold to Surface - 37

The Story of the Great Lakes Carferries - 38
By J. Julius Fanta

Electric Nerve Center Protects Auto Tunnel - - - - - - - - 43

Segar's Hobbies Put Punch in Popeye Comics - - - - - - - - 44
By Paul W. Gartner

Science Creates Thundering Lightning - 49

Air and Submarine Fleets Conquer Alaskan Wastes - - - - - - 50
By Bob Gordon

The Mystery of the Islander's Vanished Gold - - - - - - - - - 56

Grand Coulee to Dwarf World's Power Dams - - - - - - - - - 59

How Army Gunners Hit Invisible Targets 62
By Donald Roberts

First Submarine Used 314 Years Ago - 69
By Nic Sprank in Oddities of Science

Scoops That Made Newsreel History - 70
By Earl Theisen

Hunting Strange Game—the Geoduck - 79

Discovering Hidden Marvels in a Drop of Water - - - - - - - - - 80
By Julian D. Corrington, Ph.D.

Sun's Rays to Drive Aerial Landing Field 85

Sportsmen's Campfire - - - - - - 90
By Robert Page Lincoln, Hunting and Fishing Editor

SHORTER FEATURES

Solving Readers' Problems - 10

Radio Lighthouse Guides Ships to Harbor - - - - 40

Belgian Moon Rocket in Stratosphere Attempt - - 53

Magic House Makes Own Weather - - - - - - 55

Elevator Ramp Lifts Planes to Hangar - - - - - 64

$25 Prizes—Solve 3 Tricky Problems - - - - - 66

Needed Inventions - - - - 75

Kinks for Titling Home Movies 86

Amateur Knife-Throwing Act 89

Choosing a Gun for Upland Hunting - - - - - - 90

Using Fall Fishing Lures - - 92

A Handy Tackle Box - - 93

New Uses for Old Razor Blades - - - - - - 103

Generator Makes Powerful Arc Welder - - - - 107

With the Collectors - - - 114

New Inventions Speed Business 146

HOW-TO-BUILD FEATURES

Modernize Your Electric Train 99
By George Harris

Magazine Rack Also Serves as End Table - - - - 101

"Fold Tight"—A Portable Boat for Duck Hunters - 104
By Weston Farmer

Make Novelty Lamps of Scrap Metal - - - - - - - 106

Modernistic Vanity Set and Chair - - - - - - 108

Animated World Series Scoreboard - - - - - - 111
By G. Everett Van Horn

How to Lay Out and Cut a Mortise - - - - - - 112
By Verne C. Fryklund

(Contents continued on page 6)

TABLE OF CONTENTS

Continued From Page 5

NEW MECHANICAL INVENTIONS

Vacuum Cups Hold Auto Carrier - - - 36
Shell Guards Against Rock Falls - - - 36
Camera Mirrors Show Finished Photos - - 41
Meat Truck Cooled by Motor Fuel - - - 41
Dictating Machines Use Steel Tape - - 42
Aero Coaster Has Steering Wings - - - 42
Auto Boat Develops 50 m.p.h. - - - 47
Underground Fires Save Lost Oil - - - 47
Starting Plates Aid Sprinters - - - 48
Machine Re-Grooves Smooth Tires - - 48
Diving Helmet Has No Air Lines - - 48
"Talking Books" Made on Phonograph - 54
Boys Build Airflow Car for $9.65 - - 54
Egg-Beater Plane Imitates Birds - - - 58
Model Engine Runs at 11,000 rpm. - - 58
Plane Features Inverted Motor - - - 60
Radio Waves Turn Small Motor - - - 60
Newest Kitchen Inventions
Ice Cream Freezer - - - - - - - 61
Automatic Urn - - - - - - - - 61
Meat Thermometer - - - - - - 61
Midget Mixer - - - - - - - - 61
R. R. Steam Engine Runs Minus Fire - - 64
Car Is Guided by Radio Control - - - 64
Chemical Spray Conquers Fog - - - 65
Testing Machine Shoots Arrows - - - 65
Hand Light Aids Night Driving - - - 67
Inventor Perfects One-Man Sub - - - 67
Plane Has Reversible Pitch Prop - - 68
Driving Light Turns With Wheels - - 68
Remote Control for Auto Radio - - - 68
Front Is Rear on Queer Omnibus - - - 76
Ford-Powered Motorcycle Carries 6 - - 76
Handy Index Lists Phone Numbers - - 77
Battery Drives Motored Chair - - - 77
Water Bike Aids Fly Fisherman - - - 78
Mower Featured by Weed Cutter - - - 78
New Device Thwarts Auto Holdups - - 82
Radio Stops When Phone Is Used - - 82
Music Sent Over Teletype Wires - - - 82
New Double Deck Sleeping Car - - - 83
Novel Scale Computes Postage - - - 83
Tiny Car to Do 100 m.p.h. - - - - 84
Portable Shower Held by Suction - - 84
New Device Locates Buried Metal - - 84
Drafting Board Fits Brief Case - - - 84

INTERESTING SCIENTIFIC ITEMS

Giant Windbreak to Check Drouth - - - 36
Defy Heat With Fireproof Gloves - - - 40
Baby Blimp Travels by Trailer - - - - 41
Stuffed Frog Makes Novel Lamp - - - 42
Electric Device Opens Garage Door - - 47
All-Wave Radio Uses Novel Panel - - - 47
Rocks Aged with Spray Gun - - - - 48
Drouth Town Gets Water by Rail - - - 53
Filling Station Has Giant Mirror - - - 54
U. S. Train Sets Speed Record - - - 58
Largest "Swan" in Marine Parade - - - 58
New Bath Unit Conserves Space - - - 60
Patients Give Themselves Gas - - - - 65
Movie Camera Rides Trapeze - - - - 67
Periscopes Used at Crowded Track - - 67
Dry Ice Cools Body Temperature - - - 68
Woman Operates Bird Hospital - - - 74
Tiny Lighthouse Is Night Lamp - - - 74
N. Y.—Moscow Air Service Planned - - 76
Transients Build Skyscraper Wigwams - - 77
Grows Flag of Living Microbes - - - 78
Spiked Armor on Car Routs Bears - - - 78
Cotton-Tar Layer Saves Roads - - - - 82
Lights Are Built Into Armchair - - - - 83
Taxidermy Creates Odd Book Ends - - - 83

RADIO SPARKS

One-Tube Amplifier Gives Headphone Volume - 95
Short Wave Vernier Spreads Bands - - - 95
Tubes Replace Filament Rheostats - - - 95
One-Tube Short Wave Marvel - - - - 96
B Eliminator Runs Auto Radio - - - - 97
Radio Magician Answers Unseen Questions - 98

FOR THE WORKSHOP FAN

Chips From the Editor's Workbench - - 24
Boating and Fishing Tips - - - - - 88
Taking Insect Pictures - - - - - - 94
Curio Cabinet Has Album Shelf - - - 94
Novelty Suggestions - - - - - - 100
Heat Enamel Paint Before Using - - - 101
House Jack Used as Arbor Press - - - 102
Carry Kindling in "Plywoodbox" - - - 102
"Shooting Harpdon" Gets Turtles - - - 109
Forge Built of Old Auto Parts - - - 109
Home Electrician Ideas - - - - - 110
Time-saving Shop Kinks - - - - - 113

William J. Kostka
Editor

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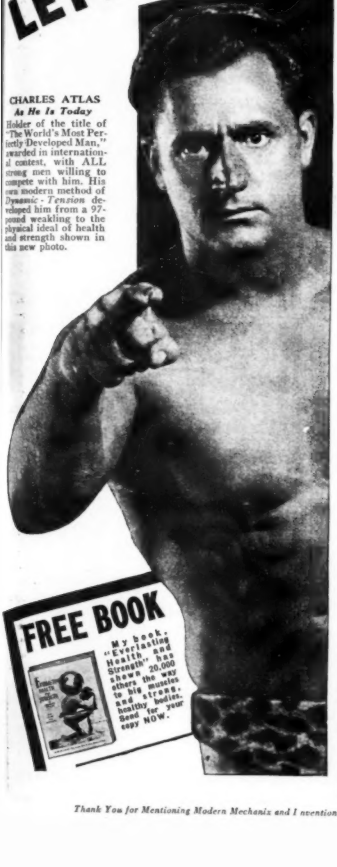

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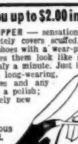

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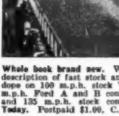

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"Soon after I began studying," he wrote to us the other day, "we had a change in management at our plant. The new superintendent said that only men who had really studied their work were in line for positions as foremen.

"I certainly was glad then that I had decided to study in my spare time. For, thanks to my I. C. S. course, I was the only man in the organization who could talk to the superintendent in his own language. As a result, I was promoted over men who had been here from ten to twenty years.

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Solutions to your own problems may be among those answered here.

RECLAIMING SILVER FROM FILMS

How can I recover the silver on old photographic films?—E. S., Columbus, Wisconsin.

Place all of the films in a porcelain dish, pour a little kerosene over them, and ignite. Cover the bottom of an agateware dish with a solution of saltpeter and water, and put in the film residue.

Now heat until the silver is separated out as a nitrate. Add hydrochloric acid, and silver chloride suitable for electroplating work will be obtained.

CLEANING PLAYING CARDS

In hot weather playing cards stick together, making dealing difficult. Can you suggest a remedy?—K. C. R., Omaha, Neb.

Slightly soiled cards are cleaned by rubbing with a soft rag which has been dipped in a solution of camphor. By dusting the cards with a little talcum powder, the stickiness can be overcome.

REGISTERING OF SMALL BOATS

Is a license of any kind necessary for home-built small boats?—C. K. J., Ely, Minn.

All boats over 16 feet long, including sailboats, must according to law be registered at the nearest headquarters of the Customs Collector. There is a small fee. Each boat is assigned a number, to aid in locating the owner in case of theft. Locate the proper office of registry by writing to the Collector of Customs at your state capitol.

KILLING RATS WITH AUTO EXHAUST

I am planning to attach a ⅝" garden hose to my auto exhaust, and push the other end of the hose down into rat holes, to asphyxiate these rodents. Will the back pressure set up by the hose damage the auto muffler?—C. H. H., Detroit, Mich.

In most cars the muffler is built to stand up without damage against considerable back pressure. If you are using a very long section of hose, it might be advisable to insert a small petcock into either the hose or the exhaust pipe, and keep it partly open.

TWO SCENES WITH ONE STAGE SET

Is there any paint suitable for stage scenery which, though invisible in ordinary light, will show clearly when the stage lights are darkened? —O. R. M., Denver, Colo.

Fluorescent and phosphorescent paints suited for the above setting are now obtainable on the Pacific coast. Invisible ultra-violet light is used to bring out the colors. A new set is had merely by throwing a few electric switches, if regular stage props are painted with these materials.

SOME PUZZLING GEOMETRY PROBLEMS

I have an algebraic proof, but have never seen a true geometric solution of this problem: Prove that, if the bisectors of the base angles of a triangle are equal, that triangle is isosceles. —F. W. L., New York, N. Y.

I have never been able to find a solution for this problem: With any acute angle of a triangle, the side opposite this acute angle, and the radius of the inscribed circle of the triangle given, construct the triangle.—F. C., Pearl Harbor, T. H.

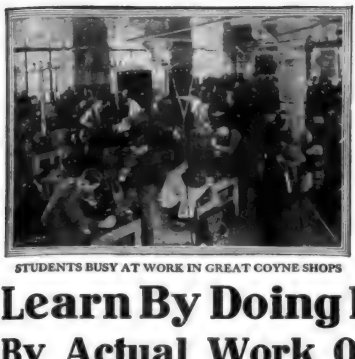
Readers are invited to send in their solutions to either of the above problems, *if they can be worked.*

BOILING LEAD TRICK EXPLAINED

I have seen performers drink boiling lead, then cough up the solid chunk. Can an amateur magician do this trick?—C. K. R., Orange, N. J.

An alloy comprised of 8 parts bismuth, 4 parts lead, 2 parts tin, and 1 to 2 parts cadmium is used by many performers for this trick. The lead is melted in a crucible, and the remaining metals then carefully stirred in. The melting point of this alloy will be around 160 degrees F., making it well suited to the purposes of a "Fire King." The mouth must be well coated with saliva—often a special heat-resisting chemical is used to guard against burns. Of course, the "lead" is not swallowed.

(Editor's Note—All letters sent to this department should include a stamped addressed envelope. Write to M-M Problems Editor, 529 So. 7th St., Minneapolis, Minn.)



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That is why we say that the book shown on the next page is for INVENTORS and Other Men with IDEAS. Some men make a business of invention. They make their living—even fortunes—that way. Other men who are not inventors at all occasionally have good, practical inventions which could be patented to their profit and with benefit to the world.

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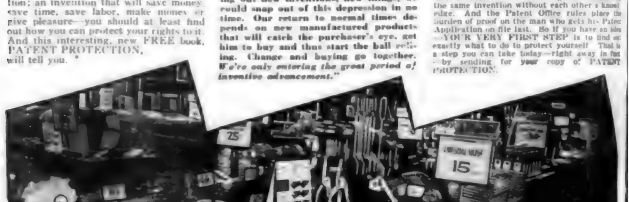

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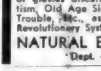

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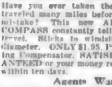

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But one day, a strange occurrence changed his whole life. During his lunch hour Ed started to read a little book he had brought to work with him.

"It's a book called 'The Key To Master Salesmanship,' Bill," he told me. "It's the most amazing thing I ever read. I never dreamed there was so much in salesmanship. You ought to send for a copy yourself. It's free."

"Bah!" said Luke Jones. "Does that book tell you how to become a salesman?"

"It sure does," replied Ed, enthusiastically.

"Don't waste your time," advised Luke. "You can't learn how to be a salesman. A fellow has to be 'born' that way to be a good salesman."

Ed just smiled at that, but he said nothing. Soon afterward he quit the shop, and we forgot about him. And then last night, I met Ed again—driving a snappy new sedan and dressed like a million dollars.

"For Pete's sake," I said. "What are you doing nowadays, Ed?" He smiled. "City sales manager for the Steel Castings Company," he told me. "What are you doing?"

"Still at the shop," I replied. "But what I want to know is, how do you come to be sales manager for Steel Castings? They're one of the biggest firms in the business."

Ed smiled again. "Remember that book on Salesmanship that Luke Jones was kidding me about one day? Well, when I finished my Salesmanship training the Association I took it from gave me a choice of a number of jobs through their Free Employment Department. I got a wonderful job, and I had wonderful training, so I've had a pretty successful time of it. They made me City Sales Manager three months ago at six thousand dollars a year."

"Good night!" I said. "And Luke and I are still punching the old time clock!"

Ed looked at me seriously. "See here, Bill," he said. "Are you sport enough to risk three cents that you can do as well as I did? Then spend the three cents to write to the National Salesmen's Training Association tonight and get their free book. Then take their course. When you are qualified, their Free Employment Department will help you get a good sales job. Not only will they help you get the job but they agree under an iron-clad money-back penalty that you must be satisfied with the training received—or they refund your tuition!"

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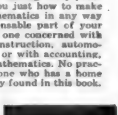

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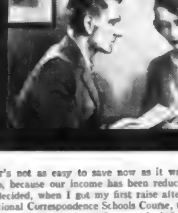

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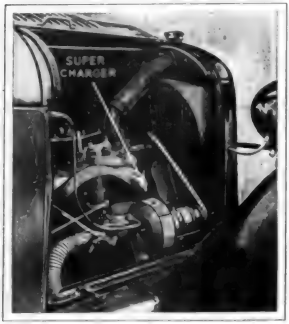
Chips from the

The "Boy on the Bouncing Balloon" bounces out with first prize. Readers the world over flood the Workbench with interesting letters.



MM plans helped J. Douglas Armbrust build this efficient supercharger for his car. The fan belt pulley drives it. This photo took the second prize in this month's contest.

AFTER wrestling with layouts, headlines, how-to-build plans and new inventions, it's great to lean back, rest the feet on the workbench and go through the stack of mail from MM readers. It's as welcome as walking into an air conditioned room when the thermometer reads 105 in the shade.

Entertaining letters from all parts of the world, bearing stamps that we can not resist clipping before the Hobby Editor sights them—interesting accounts about the workshop projects of young and old alike—those are pleasures that make magazine editing worth while.

Running through the batch of fine photographs from MM readers, we could not help but stop at the sight of the "Boy on the Bouncing Balloon." And naturally we turned to this letter that accompanied the photo:

Cleveland, O.

Dear Editor:

Here's a snapshot of me and my jumping balloon, that we built (my Dad and me). I used this balloon to jump over the Cleveland Stadium. It carries 1,000 cubic feet hydrogen gas and I can easily jump 125 feet high with it. It is inflated until the weight it lifts is just a pound less than I weigh. It supports me then, leaving my toes on the ground and I'm light as a feather. Then all I need to do to get a ride is to pull the balloon down six inches and then jump straight up in the air. I don't come down then until equilibrium reasserts itself. Lots of fun.

I believe ours is the only jumping balloon in America made for boys. We get a lot of good ideas out of MM for stunts.

Billy Crawford.

* * *

Billy Crawford is just six years old. After reading his letter, we arranged to have a check for $5.00 bounce right out of this office to the "Boy on the Bouncing Balloon" as first prize in this month's Workbench contest.

Children go for this model Gee Bee racer built by H. L. Lowenberg, of Chicago. It is powered by foot treadles.

You know, of course, that we are handing out prizes of $5.00, $3.00 and $2.00 for the three best photos and letters published in this department each month. That brings us around to the second prize which goes to a man who has benefited by watching MM's how-to-builds for useful ideas. Here's his letter:

Columbus, Ohio.

Dear Editor:

I am a constant reader of MM and have made many articles featured in its pages. I have a Lincoln Sport Plane about ready for its feathers and coffee mill; but of all the articles I have made I have derived more pleasure and benefit from the supercharger which appeared in the November, 1933, issue. Installing it on my 1928 Ford it has practically rejuvenated it: more miles per gallon, speed and acceleration to burn, and it doesn't sound like a Ford. Quite a number of people have asked me what I have on my car. When I

editor's Workbench

show them they can't believe a little thing like that can make such a tremendous difference.

J. Douglas Armbrust.

We wish we had space for Armbrust's detailed account of the parts he used in building this efficient supercharger. Tell us about the things, big or little, that you have built from MM plans. Those are the letters we want. Remember good, clear, glossy snapshot photos are all you need to enter the Workbench contests.

* * *

And third prize of $2.00 goes to a member of that harrassed band of light plane builders who tells us:

Monroe, Mich.

Dear Editor:

I am enclosing a snapshot of a Pietenpol "Air Camper" which I recently completed and which was flight-tested this summer by Lieut. LeGrande Mercure at the Silver Ace Airport near Monroe, Mich.

He was very greatly pleased with its performance, as it flew "hands-off" from the first, with no rigging changes necessary. As there were many people who wished to see it fly he made five 15-minute hops during the day.

The plane was built from the 1932 "Flying Manual" without benefit of blueprints, but I was fortunate to have the supervision of Lieut. Mercure who is a licensed mechanic as well as transport pilot.

D. M. Eberwine.

Eberwine is now putting in his solo hours in his very successful ship.

This Pietenpol "Air Camper," built by D. M. Eberwine, is the pride of Monroe, Mich. The photo won third prize.

The International Society of Modern Mechanix and Inventors is actually an international organization now, with the formation of its first charter club in Canada. It is the Nanaimo Artisans Club of Bowser, British Columbia, which received charter No. 18. James C. Jamieson is president of the club.

Billy Crawford, the boy on this bouncing balloon, is shown astounding crowds as he soars over their heads. His unusual photograph won first prize of $5.00 this month.

Here's an unusual coincidence:

Ilion, N. Y.

Dear Editor:

I noted with interest the article in the August issue concerning Norman Zapf's streamlined train shell. Norm and I went to the same school near Cleveland, he being a year or two ahead of me, and we were in the same scout troop. He certainly could build model planes.

I am sending you a picture of a car that I am finishing now. A motorcycle was built into the rear like a job I saw in MM some time ago. It has standard tread, front wheel brakes, conventional clutch and brake pedal, accelerator and gear shift lever, and seats two comfortably. It has a cut down steel chassis and a wood frame covered with canvas which is enameled.

Paul B. Reed.

Paul B. Reed built this three-wheel streamlined car around an old motorcycle engine.

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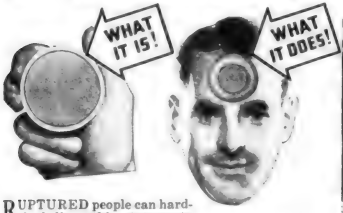

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5. How many years does a mechanical patent remain in force ?

6. How does the issuance of a patent protect the inventor ?

7. Is it compulsory to prepare a working model before making application for a patent ?

8. What is a "Record of Invention" form ?

9. Why does the Patent Office advise applicants to employ registered patent attorneys ?

10. When can an article be marked "Patent Applied For"?

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These instruments only $5.00 if you send now.

Complete set of drawing instruments only $5.00 if you send for these drafting books at once. These instruments are made of the finest of German silver are absolutely accurate and are packed in velvet lined leatherette pocket case. Real $10 value, but ½ price if ordered with these books.

AMERICAN TECHNICAL SOCIETY
Dept. D-7320, Drexel at 58th St., Chicago, Ill.

American Technical Society, Dept. D-7320, Drexel at 58th St., Chicago, Ill.
Send for 10 days' free use Nine Volume set of Drafting books. I will pay the few cents delivery charges. If I wish, I may return books in 10 days and owe you nothing but if I decide to keep them, I will send $2.00 after 10 days, then only $3.00 a month until $19.80, the special introductory price, is paid. Send latest edition. If you want the instruments check here. Total price $24.80.

Name .....

Address .....

Attach letter stating age, occupation, employer's name and address and that of at least one business man as a reference.

UNCLE SAM'S SECRET

Kenneth H. Cox, assistant U. S. construction engineer, is shown above peering through a slit in one of the secret "lookout" galleries in the Chicago postoffice from which employes can be observed. At right is the new postoffice department building in Washington. It is said the building has been equipped with 12 secret "lookouts."

UNKNOWN to most of its citizens the federal government has built up a secret tunnel system that is preventing holdups of postoffices, postal trucks and mail trains.

This system of lookout stations, installed in the new postoffices of the nation, daily protects the thousands of dollars worth of currency, checks, money orders, and securities that are entrusted to the postoffice department.

As a result robbery of great sums of money from the mails is a rare crime and when one does occur it is usually quickly solved by government agents through information obtained by the secret postal observers.

When a robbery, such as the theft of $300,000 in negotiable securities from a Chicago postoffice in 1921, takes place, department of justice men immediately seek an "inside" man in the postoffice. The secret observers name the employes who are suspected of tipping off the bandits. When the "tip off" man is found, the crime is on its way to solution, due principally to the secret tunnel system.

By means of this tunnel system postal inspectors can check on the integrity of employes of the postoffice department. Stealth of money order blanks or stamps and the opening of mail for small currency can be quickly detected by agents hidden in the secret tunnel system.

The tunnels are being installed not only to stop petty thievery in the postoffices, but mainly to foresee and prevent major robberies.

The system in each postoffice consists of a number of observation posts. These posts are placed at vantage points in the building from which inspectors and agents can watch all actions of persons entering or working in the building. The posts are often

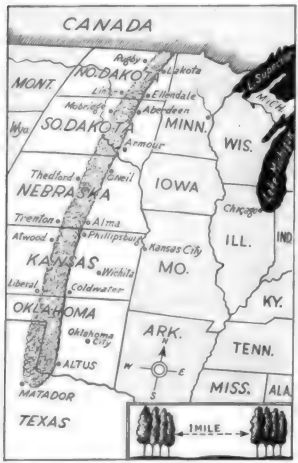
(Continued on page 133)

TUNNEL SYSTEM

by **William Jennings**

This drawing shows various places in a postoffice sorting room where secret observation posts might be located. Connected by tunnels these "lookouts" can be entered without the knowledge of postal employes or even the postmaster. The above shows three observation posts and the ladder in the foreground leading to the basement tunnel.

Giant Windbreak Bisecting Midwest to Check Drouth Perils



Map shows how 100-foot belts of trees, planted one mile apart, will bisect midwest in war against drouth perils.

ALARMED at drouth conditions which threaten to turn the midwest into a second Sahara, the government plans to erect a giant windbreak of trees, 1000 miles long, which will extend from the Canadian border to the Texas Panhandle.

Since pioneers first plowed up the buffalo grass, the top soil of the west has been unprotected from the winds which have blown away this soil and destroyed the fertility of the ground. Once gone, this soil cannot be replaced. That is why scientists fear a new desert.

The government's windbreak is intended to eliminate this danger. It has been found that a windbreak of trees checks wind erosion of the soil and reduces the evaporation of moisture as much as 30 to 40 per cent.

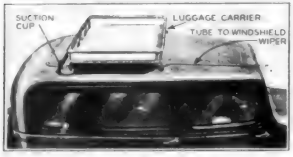
The trees are to be planted in belts 100 feet wide. One mile of farming land will lie between each of the strips. The completed project calls for 100 of these 100-foot belts, which will be planted with trees that thrive on a minimum amount of moisture, such as elms, cottonwoods, red cedar, soft maple and ash.

Preliminary appropriations of $15,000,000 have already been made for the gigantic scheme which will cost $75,000,000 and require about ten years to complete.

Vacuum Cups Hold Auto Carrier

NO SCREWS or bolts are needed to attach a new luggage carrier to the top of a car. The carrier is mounted in a vacuum storage tank frame of tubular steel, held at each corner with large rubber cups. Tubing connected to the windshield wiper supplies the necessary suction. Check valves maintain the grip when motor is shut off. The carrier is said to accommodate ample luggage for six or eight people.

Design of the carrier permits converting it into a table by attaching corner legs.



Suction holds this luggage carrier in place through the agency of large rubber cups placed at the four corners.

Shell Guards Against Rock Falls

Made of steel, this shell-like tunnel is designed to protect miners from the dangers of rocks falling from ceiling.

SCIENCE has come to the aid of the men who work our mines with the invention of a device which eliminates the dangers of rock falls from the ceiling.

The device consists of a new system of bracing and shorting—a steel shell for walls and ceiling, a section of which resembles the familiar portable garage, made in semi-circular shape of galvanized iron.

Water Forces BLACK GOLD *to Surface in* WORLD'S DEEPEST OIL WELL

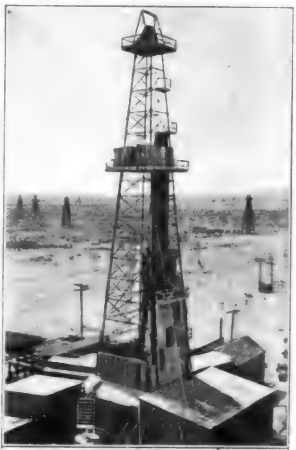
DEPENDING upon water pressure to bring the oil to the surface, drillers have succeeded in sinking a new well to a record depth of 11,377 feet—2.15 miles—on the west side of the San Joaquin Valley, California.

Because of the extreme depth of the well, which surpasses the former record by 435 feet, engineers consider unlikely the possibility of pumping up the oil in paying quantities. Hence they will rely upon the pressure of water, entering the deep oil-bearing sands from the earth's surface seven miles away, to force the oil up from the depths into the waiting reservoirs.

Record Set With Ordinary Tools

No special or extra-heavy equipment was used in sinking the record well other than that commonly used on similar jobs. Drilling progress varied greatly during the course of operations, ranging from in excess of 100 feet per day in the upper part of the shaft to as little as one foot per day, at intervals, in the 7000-9000 foot levels.

Rock bits were used in sinking most of the lower part of the shaft and on at least one occasion diamond set cōre bits were found necessary. In a number of cases the rock bits were entirely worn out after less than one foot of drilling had been completed. Despite the technical problems involved and the fact that the well was sunk to the deepest oil-bearing sands yet reached by man, drilling operations went forward with a minimum of serious trouble. There were no twist-offs of drill pipe and only three fishing jobs for lost tools.



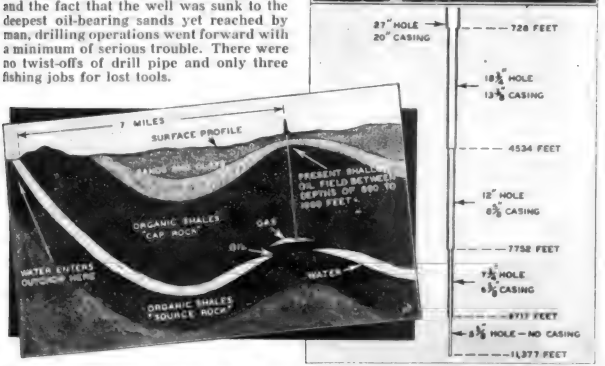


Photo shows derrick over world's deepest oil well. Left, below, how water pressure is expected to force oil to the surface. Diagram, right, shows how drill shaft was tapered. When nearing the record depth the 75-ton drill pipe made 120 revolutions per minute; yet so delicately was it suspended that less than two tons of weight forced the bit downward.

The Story of

Braving Lake Perils to Keep Railroads Rolling

Although navigation is officially closed from December 15 to April 15, Lake Michigan carferries operate the year 'round. Note bow of ship above, enabling vessel to slide up over ice and crash through by means of sheer weight.

by J. JULIUS FANTA

MOUNTAINOUS seas crash over the plunging bow; stinging spray, driven by arctic gales, whips across the bridge, coating decks and rigging with a treacherous sheath of ice. Lake Michigan is unleashing its terrible fury in a storm calculated to destroy both men and vessel; yet the gallant carferry crew fights back, determined to keep the railroads rolling on one of the world's strangest transportation systems.

In winter and summer, fair weather and foul, in heavy ice and pea-soup fog, three fleets of carferries carry on, despite the fact that navigation on the Great Lakes is officially closed from December 15 to April 15. These huge, square-shouldered train ships, nearly 400 feet long, house 32 railroad cars in four rows between decks. By running the gauntlet across Lake Michigan, these ships save the railroads a 200-mile detour via the congested Chicago route and cut schedule times from 24 to 48 hours.

Carferries bridge the lake from Milwaukee, Manitowoc, Kewaunee and Algoma on the Wisconsin side to Muskegon, Ludington and Frankfort on the Michigan shore. These Great Lakes giants are not be confused with the towed car floats used on narrower bodies of water. They are steel, sea-going ships, propelled by twin screws, turbo-electrically driven, and make the 91-mile trip from Milwaukee to Ludington in five hours.

Ship Swallows Entire Freight Train

Trains of freight cars are loaded through the open stern which is jockeyed into position at the loading pier until the tracks of the vessel join the tracks on the pier. A second pilot house at the stern of the ship simplifies the problem of docking and funnel shaped revetments guide the stern to the track-to-track position. The tracks of the car-deck are locked to those of a flexible ramp which lowers and raises as the ship is loaded or unloaded.

the Great Lakes Carferries

Cars are loaded in strings of eight, the head car of each train being coupled to bumpers at the bow. While a switch engine holds the cars together to remove the play in the couplings, a steel block is clamped to the tracks behind the wheels of the last car. With no slack in the couplings, the cars cannot roll fore and aft. The corners of each car are braced by screw-jacks built especially for this purpose. The cars are then chained against the jacks to insure against toppling over when the ship is wallowing.

Guard Cargo Vigilantly in Heavy Seas

The cargo on wheels is watched religiously when the ship is heaving, even by bridge officers. Deckhands screw the jacks tighter with sledge-hammers. Chains are checked and double checked by staff officers. When cars break loose the bridge is notified and the carferry is headed into the teeth of the gale. At this heading there is less motion and the task of stopping rolling cars is easier.

Years ago cars easily broke their primitive clamping devices and rolled from bumper to seagate. At times it was necessary to drop a string of five into the lake to save the ship and cargo. One car was released at a time, to avoid a whole train dangling over the stern and wrecking the rudder and propellers.

Occasionally storms

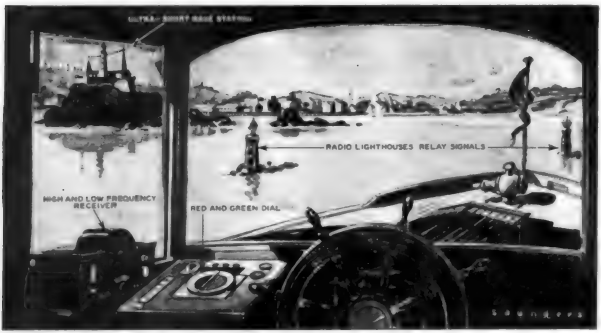
(Continued on page 135)

Above — Stern view of carferry showing how four strings of cars are loaded in the 'tween decks space. Right—A glimpse of one of the two pilot houses mounted both at the bow and stern.

Above—Note seagate at stern which is lowered during rough weather. Below—Sailing in reverse, a carferry cuts a path through the ice with its propellers.

Floating Railways

Marconi's Radio Lighthouse Guides Ships Into Harbor



Navigating blindly upon a course set up by radio lighthouse on a hill above town, yacht "Electra" safely enters harbor of Sesstri Levante, Italy, with Marconi, inventor of new fog-defying beacon, at helm. Floating buoys relay signals to vessel.

Defy Heat With Fireproof Gloves

THE rescuing of aviators trapped in blazing planes is now possible with the fireproof gloves which have recently been made a part of the fire-fighting equipment of the Royal Air Force of England.

In a series of tests which included picking blazing coal from a furnace and holding it until cooled, holding the gloved hand in the searing heat of a forge fire for thirty seconds, and bending a red-hot steel bar placed in a vise, the gloves remained unscorched. They are made of a special asbestos cloth, and are usually worn with asbestos suits.

Girl wearing new fire-proof gloves extracts blazing coals from glowing furnace, holds until cool, in test intended to show heat resisting properties of new asbestos cloth.

WITH a smile of triumph Guglielmo Marconi demonstrated successfully what he believes to be his greatest invention—a radio lighthouse. Navigating blindly, with only his radio indicating meters as guides, Marconi brought the ocean-going yacht *Electra* into the harbor at Sesstri Levante, Italy, safely.

Even as his invention of the wireless saved thousands of lives in ocean disasters, Marconi predicts his radio lighthouse will save hundreds of ships from collisions in fog just outside port.

There are three distinct units in the new marine beacon apparatus. An ultra-short wave transmitting station is located on a high promontory near the harbor. A 60-centimeter radio wave, just about the shortest found practical with present equipment, is sent out.

Two radio lighthouses supported on large buoys are anchored a little more than 300 feet apart at the entrance of the harbor. Each buoy picks up the signals of the transmitter, and in effect reflects them to ships entering or leaving the harbor.

Both visual and sound indicators are used in connection with the receiving station on board ship to tell when the correct course is being followed. A dial shows equal red and green sections when the ship is headed on a direct course for the harbor, but shows more of one of the colors at the slightest deviation from the course.

At the same time a loudspeaker gives off a continuous direction signal.

Subject Sees Own Picture Before Candid Camera Clicks

IN THE latest self-portrait camera booth, mirrors are so arranged that the subject can see exactly how she will appear on the finished photograph. Though no cameras are ever visible, from one to five poses at different angles can be snapped by the subject.

An ingenious lens and mirror system mounted just in front of the camera is the secret of the process.

After receiving instructions as to what to do, the subject enters the portrait booth alone. Seated comfortably, she sees just ahead in a mirror an image of herself which is just the same size as the finished photograph. When satisfied with the pose, she pushes an extension cord button to take the picture.

Levers operated by hydraulic means pull the mirror down for a moment to expose the film, yet the operation is so quiet and so rapid that the subject never knows when the picture is snapped.

Other mirrors are mounted around the central one; the image in each is the same as that which will be seen and recorded by the camera behind the center mirror. The subject thus studies side views of herself without having to turn her head or eyes.

The exposed film is developed, finished, and retouched by a professional photographer in the usual manner.

Seated comfortably in new portrait booth, subject sees in mirrors how finished photo will appear. Mirror falls down momentarily to expose film as control button is pressed.

Baby Blimp Travels by Trailer

Baby blimp is held fast in its auto-trailer cradle, ready for a quick ride to destination. Twenty-five feet long by 10 feet wide, blimp is used to carry aerial advertising.

AFTER building a gas-filled baby blimp for advertising purposes, V. A. Noble, Hollywood inventor, found it necessary to transport it through the streets in some manner. An elongated auto trailer solved the problem; with a V-type bed the blimp could be hauled down into its cradle and held in place by a strong net.

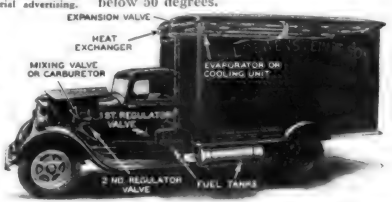
The blimp, which is 25 feet long, and 10 feet in diameter, is used for aerial advertising.

Meat Truck Cooled by Motor Fuel

REFRIGERATOR trucks using the new Petrogas are cooled by the same fuel which runs the engine. Serving the dual role of fuel and refrigerant, the new auto fuel comes in 23 gallon cylinders as a liquid under 135 lbs. pressure. In its conversion from a liquid to a gas, heat is absorbed and the truck body thus refrigerated.

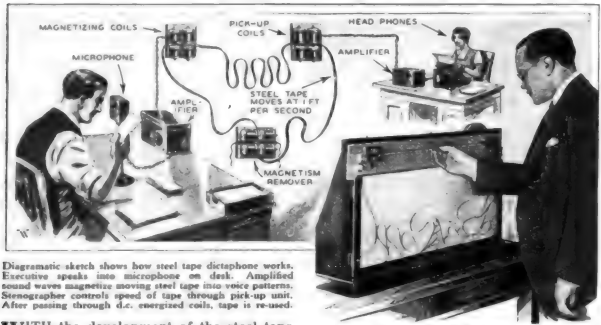
On a performance basis, the new fuel costs approximately the same as regular gasoline. The gas is perfectly dry as it enters the manifold, reducing dilution of crank case oil. Engine starting is easy at all temperatures down to 40 degrees below zero, at which point the gas liquefies.

Refrigeration is, of course, greater on long runs, but even when frequent stops are made for deliveries, the temperature is held below 50 degrees.



In this refrigerator truck, fuel cools the meat first, then drives the engine.

Dictating Machines to Use Magnetic Tape



Diagramatic sketch shows how steel tape dictaphone works. Executive speaks into microphone on desk. Amplified sound waves magnetize moving steel tape into voice patterns. Stenographer controls speed of tape through pick-up unit. After passing through d.c. energized coils, tape is re-used.

Steel tape recording machine on display at Century of Progress. Visitors speak into microphone, then hear their own voice. Similar voice delays are used in telephone work.

WITH the development of the steel tape method of sound recording, present day dictaphones may soon become obsolete. In demonstrations at the Century of Progress sound was stored in the magnetic ribbon for only a few seconds, but engineers believe it possible to construct a simplified dictating machine set along similar lines.

With the use of large rolls of the steel tape, there would be no need to change records as frequently as in the present apparatus. Court proceedings could be stored indefinitely.

Stuffed Frog Makes Novel Lamp

Mounted bull-frog fishing on bank of pool under shade of giant toadstool makes attractive table lamp. Taxidermists find great demand for specimens mounted in natural settings such as this. Tiny electric light bulbs are under the shade.

NOVELTY taxidermy, in which mounted birds and animals are arranged in special poses to serve as useful articles, is fast becoming a fad in this country. One of the most popular subjects is the frog lamp.

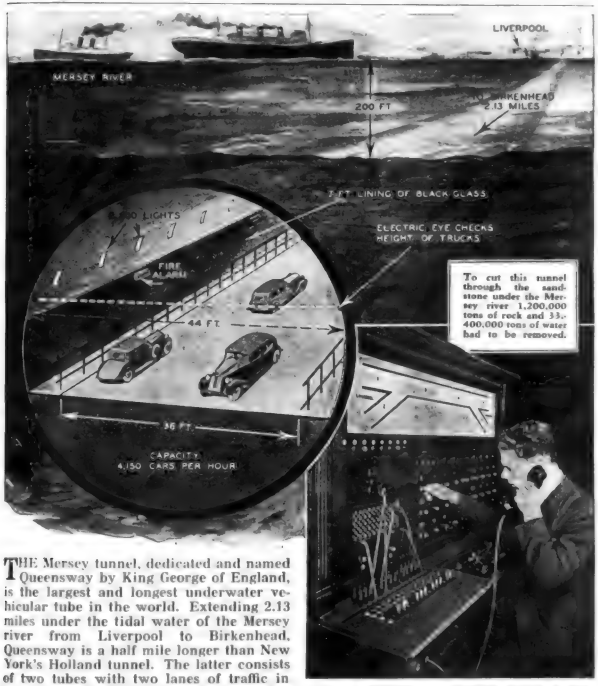
A stuffed bull-frog reclines lazily against his toadstool shade, holding a tiny fish-pole. Swamp grass glued to the base makes a realistic shore line, while a bit of mirror serves as the pool.

Aero Coaster Has Steering Wings

MOST novel of features of the aero thrill coaster recently placed on the market is the steering wing, pivoted to the coaster body at its center. Whether standing, sitting, or kneeling on the coaster, little fingers gripping the wing or pulling on the steering ropes guide it safely around corners and in thrilling U-turns. Rubber wheels give silent rolling. Two can ride easily, one sitting with feet on wings, the other standing on the tail.

Aero coaster, built of plywood with steel fittings, weighs less than 7 lbs. Wing pivots for steering. In circle boy demonstrates use as a scooter, at right as thrill-producing 'surf-board.'

Electric NERVE CENTER PROTECTS *Largest Underwater* AUTO TUNNEL



This switchboard is the nerve center that guards Queensway. Electric devices tell the operator of conditions in the tunnel. He keeps traffic moving at 20 miles per hour.

THE Mersey tunnel, dedicated and named Queensway by King George of England, is the largest and longest underwater vehicular tube in the world. Extending 2.13 miles under the tidal water of the Mersey river from Liverpool to Birkenhead, Queensway is a half mile longer than New York's Holland tunnel. The latter consists of two tubes with two lanes of traffic in each. Queensway is a single tube bearing four lanes of traffic.

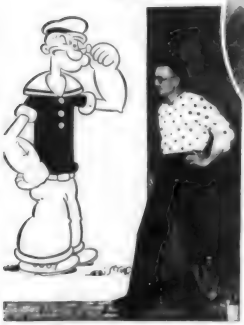
To protect vehicles passing through this tunnel British engineers have devised a complicated electrical "nerve center." Resembling a telephone switchboard, this nerve center supersedes anything of its kind in the world. Its operator controls 140 telephones, 94 fire alarm boxes, traffic control signals, and an electric eye device that prevents over-size and over weight trucks from entering the tunnel. Above the switchboard is a diagram on which is reproduced normal or emergency conditions in the tunnel.

Queensway cost nearly $40,000,000 and took nine years to build. Six ventilating plants force 2,500,000 cu. ft. of fresh air a minute into the tunnel.

Trick photography made possible the typical Popeye comic sequence shown in this photo-cartoon strip, posed by Popeye and his creator, E. C. Segar.

Ideas for strips like that above and to the right are frequently born in the home workshop where Segar gets inspiration for his comic characters.

Segar's HOBBIES PUT



Cartoon illustrations reproduced with this story are copyrighted by King Features Syndicate.

Photo shows Segar with the boat he built from his own plans in his well equipped home workshop.

Circumstances kept Segar from a seafaring life; but he finds an outlet in Popeye's seagoing adventures.

"When ideas are slow in coming," says Popeye's creator, E. C. Segar, "I sneak out to my shop and stir up some sawdust. Hitting my thumb with a hammer nearly always results in a new thought for Popeye."

by **PAUL W. GARTNER**

POPEYE, the Sailorman, the swaggering, two-fisted comic character who has endeared himself to millions of newspaper readers, has been deceiving his public.

For Popeye, who is known for his feats of physical strength, attributes his amazing "vitaliky" to the eating of spinach, whereas his real strength lies in another direction —in the workshop and sporting hobbies of E. C. Segar, his creator.

Many of Popeye's antics grow in a natural way, it is true, while Segar is poring over a drawing board; but an even greater percentage of his adventures owe their inspiration to the artist's outside diversions. Upland shooting, sailing, deep sea fishing and home craftsmanship—these are the hobbies that put the punch in Popeye. For while Segar's hands are busy with tools or sporting equipment his mind, freed of shop pressure, conceives many of the gags and situations which have made Popeye a national figure.

"When ideas are slow in coming and the drawing board doesn't feel comfortable," says Segar, "I sneak out to my workshop and stir up a little sawdust. Hitting my thumb with a hammer nearly always results in a new thought for Popeye. In fact, the idea of the character, Wimpy, came while I was laying the keel for a boat."

Segar's cartoonist career has always been associated with things of a mechanical or creative nature. Intensely interested in producing or reproducing pictures, he began

Punch in POPEYE Comics

to draw when he was ten years old. Immediately his inventive mind began to cast about for some means of making his new hobby, drawing, a more simple process. As a result, by the time he was 13 he had perfected a device which should appeal, even today, to persons of similar inclinations. Segar tells the story of one of his first ventures in home craftsmanship as follows:

"Although I had not yet thought of cartooning, I wanted to draw. To that end I built a box approximately 12 inches square. In one end I fitted a sliding lens from an old magic lantern. Inside the box was a mirror fixed to receive images coming through

Skeet shooting is one of Segar's favorite sports. Right—the shop in which many of his Popeye ideas are born.

Above—A cabinet-table built and carved by Segar.

Artist's Fishing and Sailing Hobbies Inspire Popeye's Comic Antics

Not to be outdone by his master, shown at left with a 525-pound sea bass, Popeye proudly displays his catch. This trick photo was made with Segar's all-purpose camera. Plans in MM, Jan., '34.

the lens and reflect them upward at a right angle. On top of the box I then fixed a sliding ground glass upon which the image could be focused. It was much like the finders on some cameras, although much larger. After I had the image of what I wanted to sketch in focus, I slipped the ground glass out and in its place put a clear glass over which was a piece of semi-transparent paper. The image showed quite clearly through the paper and I could readily make my sketch."

Another similar box with this same lens became Segar's first camera. Photography has remained a hobby with him to this day. He has built a number of special and trick cameras, photo printers and enlargers. His outstanding achievement along this line has been his all-purpose camera which requires no film, the plans and a description of which appeared in MODERN MECHANIX AND INVENTIONS, January, 1934. With this machine exposures are made onto sensi-

(Continued on page 122)

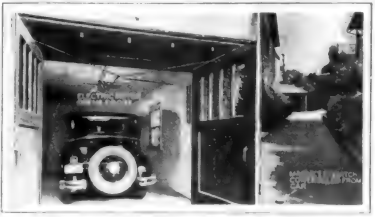
Like his famous comic character, Popeye, E. C. Segar is an ardent sailor. His seagoing jaunts provide local color for his cartoons.

Doors Open Automatically as Auto Approaches Garage

ALMOST uncanny in its operation is the newest of electric door openers for garages. No part of the installation is visible on the outside of the garage, yet the doors automatically swing open and lights flash on inside as a car approaches. In backing out of the garage the doors automatically close and lock and lights turn off in the same manner.

Buried in the concrete of the garage driveway is a magnetic switch connected to the motor-driven door opening mechanism. A special magnet installed underneath the floorboards of the car is energized through a push button on the dash as the car passes over.

The doors can be opened or closed by operating switches located inside the garage or in the house.



Garage doors are pushed open automatically by lever mechanism operated by 1/6 h.p. electric motor on ceiling. Magnetic control is located in driveway.

Underground Fires Save Lost Oil

BY setting fire to exhausted oil wells, Soviet engineers have succeeded in making them produce oil again. Air pumped down into the well supplies oxygen to the burning oil. The heat from the flames turns the remainder of the oil into a gas which is blown out of other wells in the same field, and then is condensed into gasoline.

All Wave Radio Uses Novel Panel

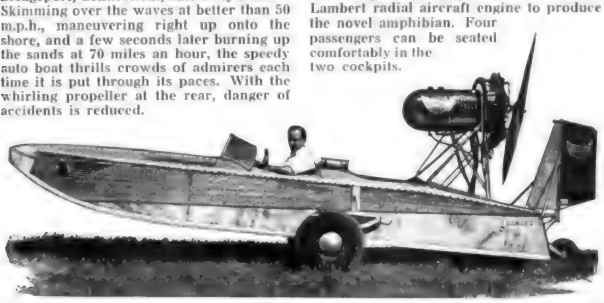
A SLOPING crystal-finish metal panel on which all parts are mounted makes assembly of a new one or two tube short wave kit possible in less than an hour. But three wires need be soldered in for the one tube model.

All parts needed for 2-tube all wave set are shown above. But 6 wires need be soldered to get set working. One dry cell and one B battery give world-wide short wave reception. Tube base plug in coils cover the different amateur bands as well as the broadcast band.

Aero-Drive Auto Boat Speeds Over Land or Water at 50 Miles Per Hour

A SPEEDY aero-drive craft which is just as much at home on water as on land emerged from the workshop of R. A. Lalli, Bridgeport, Connecticut, auto body builder. Skimming over the waves at better than 50 m.p.h., maneuvering right up onto the shore, and a few seconds later burning up the sands at 70 miles an hour, the speedy auto boat thrills crowds of admirers each time it is put through its paces. With the whirling propeller at the rear, danger of accidents is reduced.

A 30 foot long by 5 foot beam mahogany and duralumin speedboat has been combined with a trio of auto wheels, the tail assemblage of an airplane, and a 50 h.p. Lambert radial aircraft engine to produce the novel amphibian. Four passengers can be seated comfortably in the two cockpits.



R. A. Lalli (seated behind wheel) designed and built this attractive amphibian auto boat in his shop at Bridgeport, Conn.

Operator "Ages" Rocks With Spray Gun to Beautify Park

Photo shows workman "aging" rocks in Yosemite National Park with a spray gun which is loaded with a solution composed of lamp black, mineral spirits and linseed oil.

UNWILLING to wait for nature to supply the aging process necessary to beautify and soften the newly blasted granite along the Wawona road in Yosemite National Park, California, workmen are "weathering" the roadsides with special spray guns.

Equipped with cable safety belts, the operators crawl over the rock faces, spraying the surface with a solution of lamp black, mineral spirits and linseed oil. The process hastens matters materially, since natural aging, according to authorities, would require about two hundred years.

Machine Re-Grooves Smooth Tires

WITH the introduction of a new machine for re-grooving smooth tires whose original tread has worn away motorists may safeguard themselves against the danger of possible skids.

The tire is set in a roller cradle and slowly revolved by means of a hand crank as a cutting tool renews the old groove. A set screw determines the depth at which the tool operates. Simple in operation, the machine is said to deliver smooth, uniform grooves which help restore the original tread, yet do not penetrate to the breaker strip.

Worn grooves on tires whose tread has become dangerously smooth may be renewed by the machine above. The tire is placed in the roller cradle shown at *left* and slowly revolved as a cutting tool restores the worn out groove.

Starting Plates Aid Sprinters

Aluminum sprint blocks, anchored to the ground by long spikes, give track men a positive starting thrust from level ground instead of raising up out of usual toe-holes.

SPRINTERS who formerly scooped starting holes in the track may now get away faster with a positive thrust supplied by aluminum sprint blocks invented by a California athletic director.

The blocks are anchored to the ground by means of long spikes to overcome slipping backwards under pressure. The front block tilts at a 45 degree angle; the rear 60.

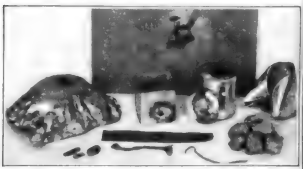
The device was given a successful test at a west coast track meet early this summer and has since been adopted as standard track equipment at a number of universities.

Diving Helmet Has No Air Lines

A SELF-CONTAINED diving helmet requiring neither air line nor pump has recently been perfected by a Louisiana mechanic. Two oxygen tanks are attached to the sides of the helmet, which looks like an inverted coal scuttle. A control valve allows a constant stream of oxygen to flow into the helmet. The inventor has descended to a depth of 45 feet; and aided by an electric headlight asserts that a 20-foot range of vision is possible under water.

Science CREATES Thundering Lightning

Just as artillery men protect their ears when big guns blast, visitors in the laboratory plugged their ears with cotton or clamped their hands over them before the flash of artificial lightning. Below are a few objects damaged by the destructive force of the man-made strokes.



Here is a closeup of the flash of artificial lightning, more powerful than any previously produced by science.

EAR-SPLITTING crashes of natural lightning have been produced in the laboratory with power and destructive force never attained before.

Engineers succeeded in duplicating natural lightning with discharges of a quarter million amperes at a pressure of 150,000 volts in eight one-millionths of a second. More than 30,000,000 kilowatts are represented in a discharge of artificial lightning.

Just as natural lightning is accompanied by deafening thunder, the laboratory discharges develop ear-splitting crashes that reverberate through the laboratories of the General Electric company at Pittsfield, Mass. The discharges are produced to study means for protecting electrical and other equipment against lightning.

The artificial discharges destroy anything they strike. A copper wire a tenth of an inch in diameter was completely vaporized. A piece of iron wire exploded. Reinforced cement was shattered to bits, just as concrete is damaged by natural lightning.

To carry the current developed in the laboratory continuously without overheating it would be necessary to use a solid copper conductor three feet in diameter.

The discharges were stored up in 96 Pyranol-filled condensers arranged in a square 88 inches deep and set up four feet above the floor on a wooden platform resting on insulators. Each condenser is rated at 50,000 volts. Three capacitors are connected in series to produce 150,000 volts. The 32 banks are connected in parallel. Heavy copper straps lead from the banks to a large copper plate and to the uppermost of 3 spheres above this ground plate.

This huge generator is charged with ordinary 110-volt, 60-cycle current.

Air and Submarine FLEETS

by
BOB GORDON

The Navy sent twelve flying boats, of the PM-1 type shown above, up the Pacific coast to join the maneuvers. These ships recently flew to Hawaii.

Here are the officers in command of the Navy's cruise. Left to right—Lt. Comdr. Stanley, Lt. Comdr. Irvine, Rear Admiral Johnson and Lt. Comdr. Shoemaker.

THREE branches of the nation's defensive forces are concentrating maneuvers in Alaska, that strategic outpost lying midway between the United States and Japan.

The Army sent ten of its newest bombers to the wastes of that northern territory. At the same time the Navy ordered twelve seaplanes and a squadron of six submarines on a training cruise up the Pacific coast to Dutch Harbor.

Officially the maneuvers were ordered for training purposes, but it was admitted that photographic maps and aerial and coastal surveys of Alaska were to be made which will be available to improve the military importance of that vast frontier.

Alaska, it was pointed out, is on a direct route from Japan to the United States with Dutch Harbor strategically located near the great circle route between the two nations. So important is the position of Alaska to the defense of the country that officials are considering the establishment of a naval base in the territory and are planning 1935 naval maneuvers in Alaskan waters instead of in the Hawaiian or Caribbean.

Most spectacular of the three maneuvers was the 7,335 mile flight of the ten Martin bombers of the Army led by Lieut. Col. Henry H. Arnold, former Plane Talk editor of MODERN MECHANIX AND INVENTIONS. The bombers are the most recent additions to Uncle Sam's aerial forces. The exact specifications and performance of the planes are a military secret, but the great bat-like ships are said to be the swiftest and most powerful fighting machines in the world.

The flight, made in 9 hops from Washington, D. C., to Fairbanks, was the most grueling test given to the planes. The bombers are said to have a top speed of 225 miles an hour and a cruising range of 1,000 miles at approximately 175 m.p.h. Each ship is

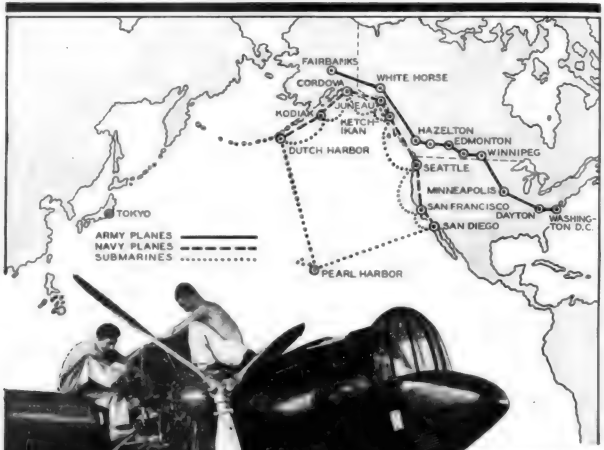
Conquer ALASKAN Wastes

Alaska's strategic position comes to the fore as Army bombers, submarines and Navy seaplanes invade the frontier territory. This story reveals importance of maneuvers.

Special insignia adopted by the Army fliers is shown above. It is a thunderbird perched on a totem pole and superimposed over an outline map of Alaska.

At right—The new fast and powerful Martin bomber used by the United States Army.

Lt. Col. Arnold at right is explaining Army bomber to Elliott Roosevelt, son of the President. Above—Type of submarine used in Alaska cruise.



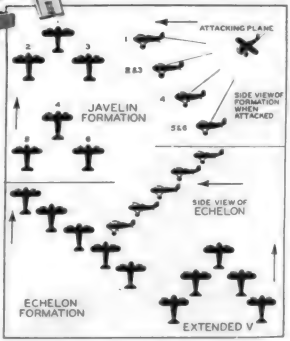
Map shows routes followed by submarines and the two air fleets. After reaching Fairbanks, Army planes made reconnoitering flights over the Alaskan wastes.

This closeup of one of the new Army bombers shows the bomb rack open on the underside of the hull. The gunner's cockpit in the bow is protected with shatter-proof glass.

equipped with four radio sets having a range of 1,000 miles. All have directional radio beam equipment. Each of the Martin B-10s is powered by two 550 horsepower Wright Cyclone motors.

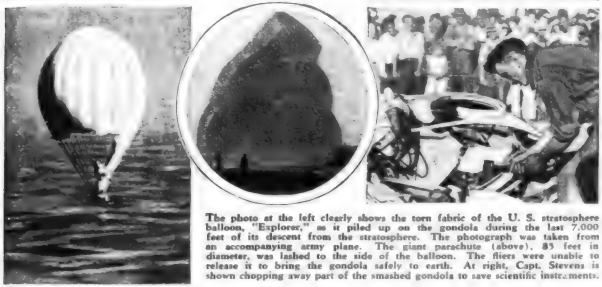
The bright yellow-winged and olive drab-bodied monoplanes have retractable landing gear, interior bombing racks, and cockpits completely enclosed with shatterproof glass. Navigating and observing officers can spread their charts in the wind-proof cabins and still have a full view in all directions. Each plane can carry a bomb load of 2,400 pounds.

(Continued on page 137)



Here are the formations used by Lt. Col. Arnold's ships.

Belgian Moon Rocket Excels U. S. Stratosphere Attempt



The photo at the left clearly shows the torn fabric of the U. S. stratosphere balloon, "Explorer," as it piled up on the gondola during the last 7,000 feet of its descent from the stratosphere. The photograph was taken from an accompanying army plane. The giant parachute (above), 85 feet in diameter, was lashed to the side of the balloon. The fliers were unable to release it to bring the gondola safely to earth. At right, Capt. Stevens is shown chopping away part of the smashed gondola to save scientific instruments.

DESPITE the failure of the U. S. stratosphere balloon flight, Belgian scientists plan a more ambitious project—a rocket to the moon.

Max Cosyns, Belgian flier, has made preparations for an ascent into the stratosphere in a balloon. When he reaches a height of twelve miles, he will release a rocket from the gondola. It is hoped the rocket will have sufficient propelling force to overcome the earth's gravity and reach the moon. The rocket weighs only two pounds and will be driven through interplanetary space by successive explosions operated by an ingenious mechanism.

In the United States experts were seeking causes for the disastrous end of the huge stratosphere balloon that carried Major William Kepner, Captain Albert W. Stevens, and Captain Orvil Anderson 60,613 feet into the atmosphere. When the balloon reached that height, the gas bag, containing three acres of fabric, suddenly ripped.

Due to a special siphon valve invented by Captain Stevens the balloonists were able to descend rapidly from the rare atmosphere to an altitude of 3,000 feet. From this height the crew safely leaped with parachutes while the gondola crashed to the ground on a farm near Holdrege, Neb.

For the first time the radio public had a "ringside" seat as it listened in to the frantic efforts of the fliers to save their balloon. Tests are now under way to determine whether the two-ounce fabric was too light or if the flight failed due to local strains on the peculiarly shaped bag and the method by which it unfolded.

The balloon and its equipment was the most costly ever built. In all almost $1,000,000 was spent on the flight.

The giant gas bag held 3,000,000 cubic feet of gas, only 700,000 cubic feet smaller than the *Graf Zeppelin*. It took nine hours to inflate this world's largest balloon. It carried a 450-pound gondola and 7,000 pounds of lead dust ballast, camera, and scientific instruments.

The balloon was equipped with a parachute, 85 feet in diameter, which was intended to bring the ship safely to land. When the fabric gave way, the balloonists were unable to release the parachute and practically all instruments were destroyed when the gondola crashed.

Drouth Town Gets Water by Rail

FACED by a serious water shortage when two lakes went dry in the recent record drouth, citizens of Creston, Iowa, solved the problem by importing water, via railroad tank car, from Council Bluffs, 100 miles away. The water was then pumped from the cars into settling basins. More than 400,000 gallons were transported daily.

Photo shows water shipped from Council Bluffs to Creston, Iowa, being pumped into storage basins during the drouth.

One Hour Phonograph Records Produce "Talking Books"

E. H. Harris, inventor of "talking book," demonstrates his machine to J. R. Atkinson, founder of Braille Institute.

BRINGING a new world of amusement and education to the blind, the phonograph recording invention of Edward R. Harris of Hollywood, California, makes records playing one hour on a side perfectly feasible. The long-promised "talking book" comes into the realm of reality, for an average novel of 65,000 words can be crammed into two 16 inch discs which "talk" themselves out in a little more than two hours.

In addition to novels, the new invention will bring to the blind at a reasonable price any of the scientific books now available to others.

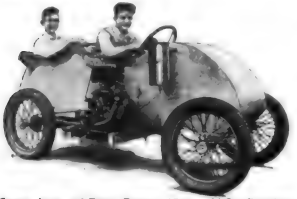
Operation of the reproducer is entirely electrical. The sensitive, light weight pick-up unit with needle is connected to a radio amplifier and loud speaker. The speed of reproduction of the "book" and the volume of the speaker are varied by simple dial controls. The method of cutting records to play for so long a time interval, the most important part of the invention, has not yet been revealed by Harris. The record-making mechanism is, however, constructed on the general lines of the original Edison phonograph invention.

Boys Build Airflow Car for $9.65

TWO 17 year old San Francisco boys, Ernest Brymer and Steven Arata, decided they wanted a car. Pooling their finances, they made a technical survey of every motor-wrecking establishment in a ten mile radius. At the end of two weeks there was exactly 15 cents left of the original $9.65 pool—but they now had a car.

From a three dollar motorcycle engine, one wheel brake, bicycle chain connecting rod, and a mess of odds and ends they had borrowed, cajoled, or bought from friends about town was constructed their open air runabout, and the last 15 cents went for oil. According to the enthusiastic boys, the tub-like car will do 42 miles an hour on level roads. Differential problems were overcome by using a one-wheel drive.

Fuel flows by gravity from the two-gallon tank mounted on the side of the car to the twin cylinder motorcycle engine. The original motorcycle crank hanger has been left in place to permit the usual "kick" method of starting the engine.



Steven Arata and Ernest Brymer, 17-year-old San Francisco boys, are ready for a spin in motorcycle engine powered car they built for $9.65. Top speed is 42 miles an hour.

Filling Station Has Giant Mirror

Giant mirror in front of Pasadena, California, service station gives motorists view of their car as well as of themselves. Tires can be inspected without leaving the car.

WHAT is said to be the largest outdoor mirror in America has been set up by a Pasadena, California, service station with the thought of flattering the vanity of auto owners, both male and female.

While gasoline is being shot into the tank the motorist faces a life size reflection of himself and his car in a 7 by 12 foot mirror mounted on the side of the station. As he makes the turn to drive out a full size side view of the car is obtained. A plate glass window was silvered to make the mirror.

Dr. H. D. Chatterton, Pasadena eye specialist who designed and erected this station, asserts a big mirror draws more customers than any other attraction.

Magic HOUSE *Makes Own* WEATHER

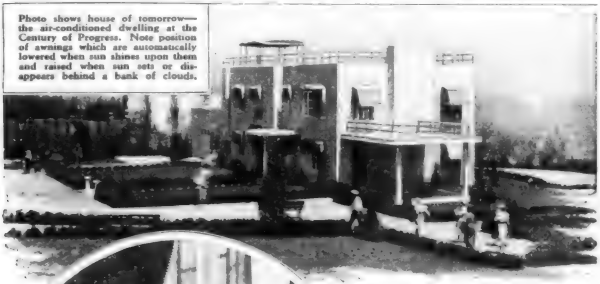


Photo shows house of tomorrow—the air-conditioned dwelling at the Century of Progress. Note position of awnings which are automatically lowered when sun shines upon them and raised when sun sets or disappears behind a bank of clouds.

FEATURED at the Century of Progress is a magic dwelling which literally makes its own weather.

The secret of the process lies in a remarkable air-conditioning system which cools the air when it is too warm and heats it when it is too cold, dries it when it is too moist and humidifies it when it is too dry, cleans it of pollen, dust and odors and keeps the air conditioned at all times.

Sensitive recorders placed on window sills close the windows if a shower comes up; and awnings are lowered or raised automatically by action of sun's rays.

Circle above—Children may play indoors in comfort on the hottest days in the air-conditioned house. Note aquarium filled with water extracted from air in one hour's time and glass ball filled with dust in the same period. Left above—Button panel regulates heat or cold through air conditioner, left; opens or closes doors and windows and raises or lowers bed to more comfortable positions. Right—Demonstrating with an atomizer how windows close at the first hint of rain.

THE MYSTERY *of* THE

FOR more than thirty years a ghostly company of seventy dead men has guarded a golden secret—seventy miners who perished when the Klondike treasure ship, *Islander*, outward bound from Skagway to the States, plunged into the icy depths of Stephens Passage with a $3,000,000 cargo of golden nuggets in her hold.

Today after a series of salvage operations unrivaled in marine history, the broken, barnacle-encrusted hulk of the ill-fated ship lies beached on Admiralty Island, near Juneau, Alaska; but the secret of the crash or the fate of the golden cargo still lies shrouded in mystery.

The story of the golden treasure which has long been marked on countless salvage maps goes back to a night in August, 1901. Loaded with a hundred and sixty-five sourdoughs returning from the Klondike gold fields with the treasures they had wrested from the Yukon muck, the Canadian steamer, *Islander*, was surging steadily through the night, her stout bow cleaving the swirling waters of Stephens Passage.

The *Islander* carried a precious cargo. Upwards of three million dollars in gold dust and nuggets were supposed to lie in the purser's safes, deep in the hold.

On the upper decks gayety reigned. Within the brightly lighted cabins and saloons rollicking music set heavy boots thumping in jubilant rhythm. Glasses were lifted high in toasts of success. Cheers, songs and raucous laughter exploded upon the night air, drowning even the sound of the threshing engines and the fury of the icy blasts which whipped across the strait from the bleak expanse of Taku glacier.

Suddenly there was an ominous crash and the *Islander* staggered. Men were hurled from their feet against the walls and the listing deck. Panic seized the milling crowd. Shrieks and curses split the night.

(Continued on page 140)

Photos copyrighted by Leonard Delano, 1934

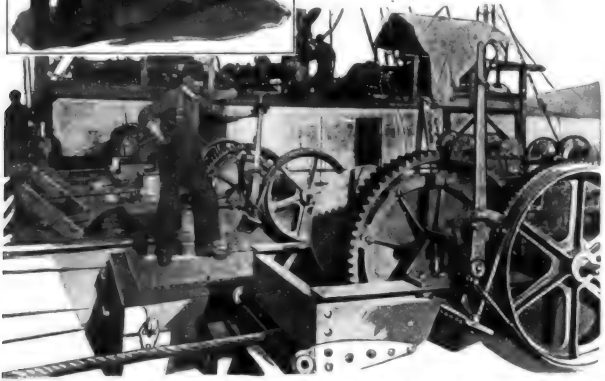
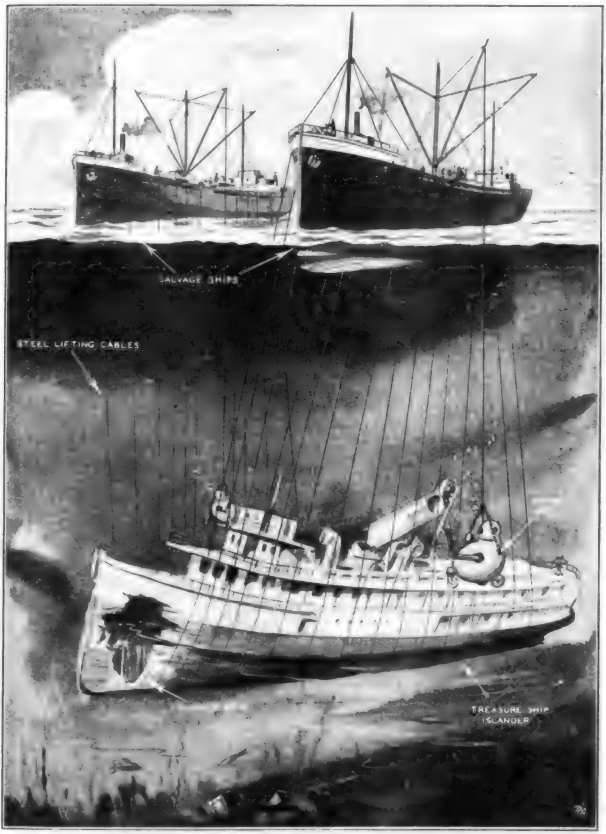


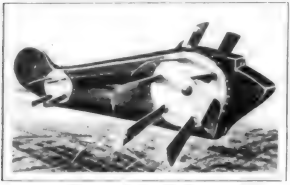
Photo left above shows Frank Curtis leaning against the special diving apparatus used to direct operations in raising the "Islander." Note the steel grasping claw on the device. Below—Some of the forty winches which raised the ship.

Islander's Vanished GOLD



Sunk in 365 feet of water in Stephens Passage, near Juneau, Alaska, the "Islander" was raised by a series of steel cables, as shown above, attached to forty lifting winches. Tidal movements were utilized to warp the sunken vessel shoreward.

Egg-Beater Wing Plane Imitates Hovering Flight of Eagle



Seven-foot scale model of Dr. F. K. Kirsten's "cycloidal flying machine" was inspiration for this artist's sketch of plane in flight. Note resemblance of wings to egg-beater.

REVOLVING blades resembling somewhat the working parts of an egg beater replace wings and tail stabilizers on the "cycloidal flying machine," an airplane designed to reproduce the best features of an eagle's flight.

A seven foot model of the unusual craft has already been built in the aeronautical laboratories of the University of Washington by its inventor, Dr. Frederick K. Kirsten. The novel wing mechanism is expected to give higher speeds, hovering flight, and slower landings.

U. S. Train Sets Speed Record

ROARING northward from Chicago to Milwaukee, a regular passenger train broke all existing steam locomotive records for sustained speed with an average of 90.6 miles an hour. The previous record, held by an English train, was 81.6 m.p.h.

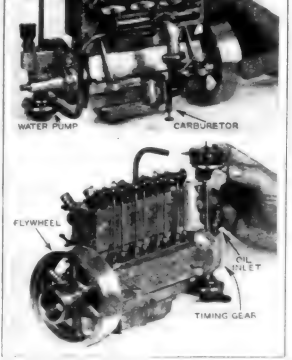
With Engineer William Dempsey of Milwaukee at the throttle the huge Baltic type engine pulling five cars at times whizzed over the rails at better than 103 miles an hour. The speed run not being advertised, passengers were unaware of it until they reached Milwaukee.

Largest "Swan" in Marine Parade

TOWERING thirty times actual size on the waters, the world's largest "swan" accompanied by its two "youngsters," was declared by onlookers to be the most unusual float ever entered in the annual marine festival at Santa Barbara, California. Moving majestically over the waters in a mile long parade of decorated and illuminated craft from all parts of Southern California, the giant bird proved a "float" in the true sense of the word.

World's largest swan replica, 30 times actual size, built over 75-foot boat, was outstanding float in annual marine parade at Santa Barbara, Cal. Floodlights are atop pole.

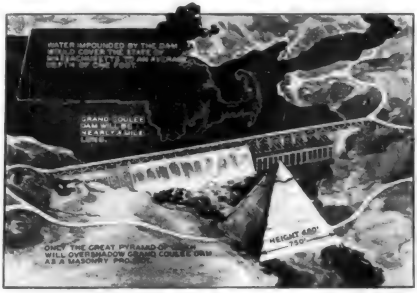
Model Engine Runs at 11,000 rpm.



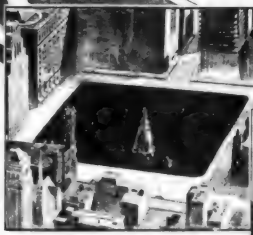
Two views of tiny 4-cylinder gas engine weighing but 7½ lbs. Ball bearings support crankshaft. Pump forces oil through hollow crankshaft to rods. Length is 10 inches.

WITH a normal running speed of from 6000 to 11,000 r.p.m., a model 4 cylinder gasoline engine exhibited by Dr. Gunnar Linner of Minneapolis, Minn., weighs but 7½ pounds without ignition batteries. The head and block are cast from aluminum, with steel liners for the piston walls. Ball bearings on the counter-balanced crankshaft make possible the terrifically high speed. The engine is ideal for larger model airplane power plants, for model boats up to 5 feet long, and for midget autos.

Grand Coulee to Dwarf World's Power Dams



CONCRETE USED IN THE DAM WOULD PAVE A CIRCULAR HIGHWAY 2 CARS WIDE AND 5,500 MILES LONG ENCIRCLING THE UNITED STATES AND CANADA.



THE EXCAVATION OF 11,000,000 CU. YDS. OF EARTH FOR THE DAM WOULD DIG A HOLE ONE CUBIC CITY BLOCK UNDER PHILADELPHIA'S CITY HALL.

Larger in scope and cost than the Panama Canal (exclusive of fortifications), the Grand Coulee Dam in the Columbia river, midway between Spokane and Seattle, is the greatest power, reclamation and flood-control project ever conceived. The first step in the Grand Coulee development will cost $63,000,000 and take five years to build. This key dam is expected to be 240 feet high and will produce 700,000 horsepower. A second step will almost double the height of the dam, making it the highest overflow structure in the world. Eventually the project is expected to include 11 separate dam units with an estimated output of twenty billion kilowatt hours of power. The project will reclaim more than a million acres and raise taxable wealth to a billion dollars.

Ultra-Short Radio Waves Turn Small Motor at High Speed

Photo shows the device recently perfected by scientists which utilizes ultra-short radio waves as a source of power to turn a small motor at high speed. Success of the experiment may revolutionize future of the electrical industry.

THE practical transmission of radio power was recently demonstrated by scientists who have developed a receiver which picks up enough energy to turn a small motor at high speed.

The success of the experiment indicates that further research may develop a vast quantity of cheap power from ultra-short, ultra-fast radio waves less than 7 meters in length. Thus factories might be operated, streets lighted and home appliances driven, independent of present power sources.

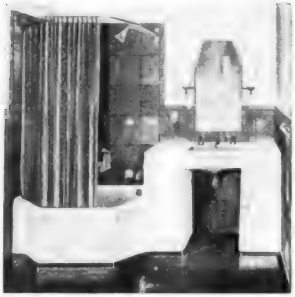
Research into the mysteries of the ultra-short radio waves have already revealed that the 5-meter wave will kill eggs and weevils found in storage grains.

New Bath Unit Conserves Space

COMBINING tub, lavatory and towel cabinet into one compact unit, a new bathroom fixture not only is roomier than the old style equipment but actually occupies less space.

The tub supports one end of the modernized wash bowl and is recessed under it, providing a standard 5-foot length. A towel cabinet supports the other end of the bowl. The front of the tub bulges outward to provide shower bath facilities.

The lavatory, or wash bowl, is equipped with two wide, flat ledges which afford ample space for toilet or shaving requisites. Towels, medicines and other bathroom accessories are stored in a cabinet under the bowl.



Note compactness of this new bathroom unit which combines tub and shower, lavatory and roomy towel cabinet in one.

Plane Features Inverted Motor

Designer Lawrence W. Brown is shown in the cockpit of the partially completed racing plane. Note motor position.

REPRESENTING the last word in thin-wing racing planes, a new ship developed in Los Angeles is featured by an inverted motor.

New speed records are expected to be established with the unusual craft, whose motor develops 300 h.p., has a 544 cubic inch displacement and weighs 415 lbs.

The wings of the new ship are extremely thin, with a knife-like leading edge, calculated to increase the air speed, although flaps in the wing will slow the landing speed to less than 50 miles an hour.

Flier Sets Delayed 'Chute Record

BAILING out at an altitude of 26,575 feet, a Soviet flier dropped to within 650 feet of the ground before pulling the ripcord of his parachute—reported to be a new world's record. The five mile drop through space lasted slightly less than two and one half minutes.

Ice Cream Freezer, Meat Thermometer Feature Newest KITCHEN Inventions

Automatic Urn rings a bell and lights lamp in base when the coffee is done.

Meat Tester tells when the roast is rare, medium or well done when thermometer is inserted into the center of the meat.

Ice Cream Freezer is motor driven and consists of a metal cylinder in which ingredients are placed. Motor cord is attached to outlet and freezer is placed in cake compartment of refrigerator. Motor stops automatically when ice cream has frozen.

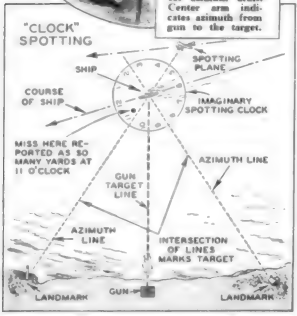
Midget Mixer, operated by one hand, quickly beats eggs or whips cream, leaving the operator's other hand to add ingredients.

Addresses of manufacturers of products on this page or of any other products described in this issue may be had by sending a stamped, self addressed envelope to Modern Mechanix and Inventions, 529 S. 7th St., Minneapolis, Minn.

HOW *Army Gunners*

This is scored as a hit by coast defense gunners. The 16-inch shell just missed the towed target. The larger area of an actual ship would have been struck, however.

View of plotting room. Men at table set azimuth arms. Center arm indicates azimuth from gun to the target.



When enemy ship is further than ten miles or hidden by smoke screen, observation plane reports location of ship and spots shells on imaginary clock. Observer gets azimuth lines on shore landmarks and radios gun battery.

LIFTING their threatening muzzles to the sky, the giant guns of the Army's coast defense system stand ready to repel America's enemies. Yet the men behind these guns are literally "blind." They seldom, if ever, see the distant targets on which their guns are trained.

The effective range of a 16-inch seacoast gun is 26 miles. The speed of a modern battleship is about 30 miles an hour. During time of war, no capital ship would approach a defended fort in clear weather without the protection of smoke screens laid down by planes or destroyers. Hence at extreme ranges under battle conditions, the gunner's task is infinitely more complicated than merely sighting his gun on a target and blazing away.

Spotting Unseen Targets

Before a gun can be fired accurately the crew must be furnished with the direction to the target and the proper range elevation. Another item to consider is the fact that the target is a moving ship. Hence the gun must be aimed not where the ship is when spotted, but where it will be when the shell arrives. In addition, the so-called "variables" must be taken into consideration and accurately computed.

These variables are matters that cause the trajectory of the shell to deviate from its normal course as plotted under ideal conditions at the proving ground. The most important of these is air density. The trajectory of a shell traveling in a complete vacuum for instance would be a symmetrical curve. Air resistance, however, slows it

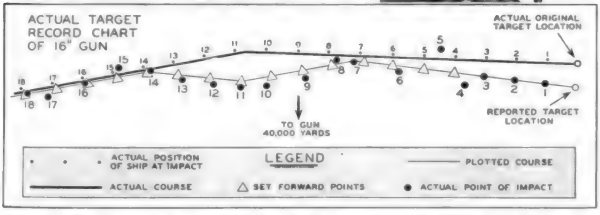
HIT INVISIBLE TARGETS

by
DONALD
ROBERTS

down, causing it to descend at a greater angle than it rises. If only the density of the air at the surface had to be considered the problem would be comparatively simple; but a 16-inch shell rises twelve miles at maximum range, passing through several layers of atmosphere of varying densities. Airplanes or pilot balloons may be sent up in peace time to determine atmospheric conditions at various heights; but in war this is usually impossible or impractical, hence tables of averages for the various seasons, based on sea level readings, must be used. With a possible error of 1¾ miles at a 26-mile range, the importance of these readings is readily apparent.

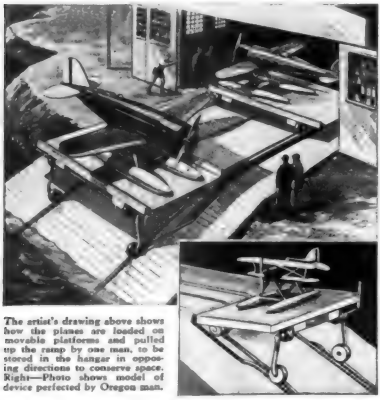
The velocity and direction of the wind is also important, for a 30-mile cross wind would carry the projectile two miles out of line at the maximum range. Since the wind varies at different altitudes, the percentage of time these varying forces act upon the shell must be computed.

(Continued on page 126)



To understand this actual target record read from right to left. Observers were in error on correct target location until 14 when first hit was scored. With shots fired at one minute intervals, 2 and 3 were on way before correction could be made for one. Shots 4 and 5 were off due to variables, such as wind, powder or the earth's rotation.

Elevator Ramp Lifts PLANES to Hangar



The artist's drawing above shows how the planes are loaded on movable platforms and pulled up the ramp by one man, to be stored in the hangar in opposing directions to conserve space. Right—Photo shows model of device perfected by Oregon man.

WITH the aid of an elevator ramp recently perfected by an Oregon inventor, one man is said to be able to move planes in and out of a hangar with maximum efficiency.

The device consists of a loading platform whose wheels are staggered in such a manner that an even keel is maintained as it moves up and down the rails of the inclined ramp.

The operation of the device is simple. The platform is lowered into the water to permit the plane to be taxied onto its surface and is then hauled up the ramp by a tow rope.

The planes are stored on these platforms facing in alternate directions. By allowing the wings of one plane to fit into the open space behind the wings of adjacent planes great economy of space is effected which is expected to cut hangar storage costs to a remarkable degree. In addition, the system is said to cut hangar construction costs since the curtailed space reduces the width and the roof span.

R. R. Steam Engine Runs Minus Fire

REPLACING the conventional firebox and boiler with a water tank, W. J. Kremer, an inventive engineer, has perfected a fireless steam locomotive now in use at the Brooklyn Navy Yard. Use of the engine is localized since it must re-steam from a boiler storage tank every twelve hours. The usual pistons and gears drive the locomotive at a speed of 12 miles per hour. Its power is said to be treble that of similar sized engines.

This novel engine has no firebox but fills up with steam and water from a storage tank on a siding every 12 hours.

Car Is Guided by Radio Control

Photo shows inventor, M. J. Francill, right, stopping his radio-controlled car with a sending set at police command.

A NEW device recently invented operates an automobile by radio control. Radio impulses, delivered by a sending set, put the car through a series of maneuvers such as starting, stopping, steering, blowing the horn and switching the lights on and off. By making certain adjustments in the sending and receiving apparatus, the inventor is also able to shift gears on the car.

Fog, Aviation's Worst Peril, Conquered by Chemical Spray

FOG, deadliest menace to the aviator and mariner, has at last been successfully overcome. In recent tests at the Round Hill, Mass., research laboratory of the Massachusetts Institute of Technology a fog free "tunnel" was opened across the entire width of the 2000 foot airport.

Using a 30 foot high trellis of pipes fitted with special nozzles, calcium chloride solution was sprayed through the fog as a misty curtain of tiny drops. Falling downward, the chemical droplets attracted the tiny water globules which make up fog. By this means fog, turned into rain, dropped to the ground, and left the air clear.

Henry C. Houghton, Jr., originator of this process, believes that powdered calcium chloride will prove even more effective. In this form it can be scattered over large areas such as airports by plane.

Chemical mist shot through these special nozzles into fog by 100-ft. length of piping on high trellis dissipates fog.

Patients Give Gas to Themselves

With new machine devised by W. R. Henion, Minneapolis, Minn., dental patients can administer just enough gas to themselves to retain consciousness, yet deaden pain. Gas control lever is held in hand. Note how mask fits over nose.

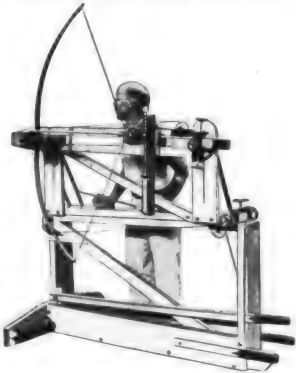
PERSONS sensitive to the dentist's drill can now give just enough gas to themselves to deaden the pain, yet retain consciousness. The Analmeter, a machine devised by Walter R. Henion, Minneapolis dental technician, is in reality a timing machine which permits patients to administer nitrous oxide and oxygen to themselves in any desired quantity.

A control valve which the patient holds can be used to give more gas at any time when the pain of dental work becomes unbearable. The 40 year old inventor perfected this device because of his wife's supersensitiveness to pain in the dental chair. Dentists now using it assert it is a very important step towards the elimination of pain.

Arrows Shot by Machine as Test

ARCHERY enthusiasts are finding science's latest mechanical robot of real benefit for testing their arrows. Gripping the bow tightly in one claw-like arm, the machine shoots arrow after arrow in precisely the same direction and with the same force. The machine resembles the crossbow of ancient times.

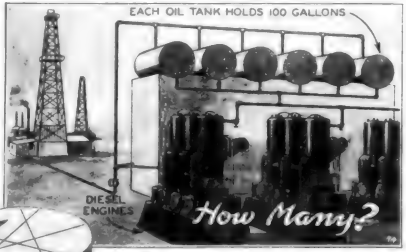
Paul J. Duncan of Chicago, Ill., designer, can determine just how much off balance an arrow is by noting its deviation from the bulls-eye of the target. Accurate aligning fingers keep the arrows in position at both the bow and the string, while two steel fingers pull the bow string back in preparation for another shot. Bows are tested for power and accuracy in the same manner.



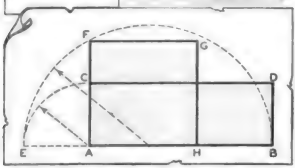
Robot arrow-shooting machine being operated by inventor, P. J. Duncan, Chicago, tests arrows for archery enthusiasts.

$25 PRIZES—*Solve 3 Tricky* PROBLEMS

CHEESE — Into how many pieces will the cheese be cut by the four slices shown at the right?



DIESEL ENGINES—Three engines use in 2 weeks all oil in two 100 gal. tanks plus all oil pumped into tanks from nearby oil well. Two engines use in 4 weeks all oil in two 100 gal. tanks plus oil pumped into tanks during 4 weeks. Oil is pumped into each tank continually at uniform rate. How many engines will use in 6 weeks all oil in six 100 gal. tanks and all oil pumped into tanks during that time?



GEOMETRY—Prove that square AFGH is exactly equal in area to rectangle ABCD. Note that EA is equal to CA.

CHEESE, squares, and Diesel engines offer exceptional variety in this month's problems. Try working them in your head!

For the neatest and most accurate solutions for all three problems, accompanied by explanations of 100 words or less telling just how each problem was worked, MODERN MECHANIX AND INVENTIONS offers $25 in prizes, as follows: First prize $10; second $5; and four third prizes of $2.50 each.

Contestants must give age, occupation, and education, though this information will not be considered in awarding prizes.

Your entry should be postmarked before September 25, 1934. Decisions of the judges will be final, and no entries will be returned. In case of ties, duplicate prizes will be awarded. Answers and names of winners will be in the December issue.

Employees of this magazine or their relatives are not eligible to compete. You don't have to buy a copy or be a subscriber to enter. Address Tricky Problems Contest, 529 So. 7th St., Minneapolis, Minnesota.

Winners in "Life In Ice" Contest

FEW M-M readers believed it possible for a man to live for 28 days in a cake of ice, but these few offered some very interesting reasons in their August "Life In Ice" contest entries. Quoting at random from a few of the letters:

The heart of a hypnotized person slows down, and often does not beat at all . . . The ice acts as an insulating material to hold body heat in . . . The body needs little or no nourishment when at rest . . . A subject trained to breathe properly can exist on very little oxygen.

To Dr. D. A. Crawford, Cleveland, Ohio, goes $10 for his explanation of how a man can be buried alive in ice. Mason McQuiston, Marshfield, Ore., wins $5, and prizes of $2.50 each go to Joan Smith, So. Uniontown, Pa., Walter Rosicky, Jr., Omaha, Nebr., G. D. Moncada, Luis Moya, No. 82, Mexico, and Karl A. Krantz, Warren, Pa.

Here are a few random selections from letters maintaining that life in ice is impossible: The compressive force exerted by the hollow ice cake would crush a human skull . . . The hypnotist could not control his subject through the ice . . . In a month a man's beard becomes very noticeable, yet no beard is visible on the photos.

To James Talbot, Santa Barbara, Cal., goes first prize of $10. Richard Verbrugghe, Jr., Detroit, Michigan, wins 2nd prize of $5; Hugh W. Lewis, Philadelphia, Pa., Glenn Newman, De Witt, Mich., Frank Takahashi, Chicago, Ill., and Paul English, Etna, Pa., each receive $2.50 for their letters.

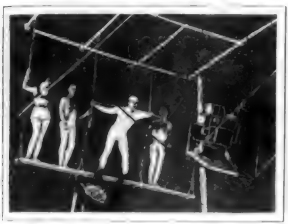
Germans Use Periscope to View Races at Crowded Track

THE problem of obtaining an unobstructed view at crowded race tracks has been solved by German enthusiasts who use periscopes to see over the heads of the throng.

Mounted upon light weight canes, the mirrors are adjustable to any angle. Thus the operator may hold the periscope-cane at eye level and clearly follow the action of the race at any point on the track. The device has been tried out in Berlin, Germany, where it was received with great enthusiasm by turf followers unable to gain the coveted positions along the rail.

Racing enthusiasts of Berlin, Germany, are shown using hand periscopes to get an unobstructed view of the track

Movie Camera Rides the Trapeze



Joe E. Brown, movie comedian, launches himself into the air as a flying camera registers closeups of the action.

FACED with the task of securing a number of aerial closeups in a recent trapeze sequence, movie technicians mounted a camera on a framework attached to the trapeze itself. When the actor began his aerial acrobatics, the motor-driven camera, swinging through the same arc as the performer, registered a remarkable series of shots, filmed in mid air, high above the circus ring.

Inventor Perfects One-Man Sub

BUILT by an amateur Chicago inventor, a one-man submarine recently underwent a successful test near Hammond, Indiana. The craft quickly submerged, cruised under water for a mile and returned on the surface.

The contrivance is ten feet long, twenty inches wide and thirty-four inches high. The weight is less than 1000 pounds. The craft is equipped with an air regulator and is powered by an 18-volt motor.

Hand Light Aids Night Driving

Red reflector is mounted on a rubber half-glove as illustrated.

THE confusion over driving signals when motoring at night is largely eliminated with a new device which straps to the back of the hand.

A rubber half-glove is fitted with a red reflector of Bohemian glass which makes hand signals easily visible at all ordinary distances.

Photo shows the inventor as he set out for a successful trial spin in his one-man submarine near Hammond, Ind.

Reversible Pitch Prop Permits Almost Vertical Descent

Photo shows aviation official inspecting the new propeller which is reversible in flight. A plane thus equipped is said to land and take off in less than 50 feet of space.

HERALDED as one of the most revolutionary inventions in modern aviation, a new propeller, whose pitch may be reversed in flight, is said to permit almost vertical descents and takeoffs.

The basic principle of the new propeller is simple. Instead of pivoting, the propeller turns all the way. Full speed astern becomes as easy as full speed ahead. The forward progress of the plane is immediately retarded, and the ship goes down in a gentle, almost vertical descent. Used instead of brakes, the propeller is said to eliminate ground loops.

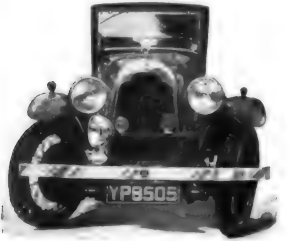
The new prop can be pitched to any degree, as compared with the two degrees of pitch possible with present types.

Driving Light Turns With Wheels

MOVING right or left in unison with the wheels, a special spotlight projects its rays around a corner far in advance of the car, making night driving safe.

The light operates by means of a rod coupled to the drop-arm of the steering gear and provides advance lighting at any angle. In case of a collision, a safety clutch instantly uncouples the light to prevent locking of the steering gear.

Slung low, the light will not dazzle oncoming traffic and is of great aid in picking up a ditch or curb on foggy nights.



Note how spotlight turns with the wheels, giving advance lighting around corners to make night driving safe.

Dry Ice Cools Body Temperature

Physicists of Purdue university recently perfected the "wrist watch refrigerator" shown in the photo—the last word in hot weather comfort. Dry ice contained in the metal disk strapped to the girl's wrist cools the blood which is pumped to other parts of the body, resulting in a general lowering of temperatures throughout the entire system.

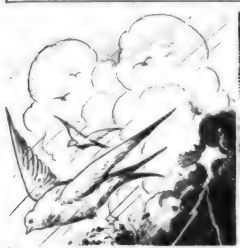
HOT weather discomforts may be a thing of the past with the invention of a new "wrist watch refrigerator." A small metal disk containing a quantity of dry ice is strapped to the wrist. The ice cools the blood, resulting in lower body temperature.

Remote Control for Auto Radio

A THREE-TUBE auto radio giving excellent local reception at all times and DX during evening has a steering column tuning unit containing all tuning stages of a "superhet" receiver. One tube is in the tuning control.

Only a two-tube amplifier is needed with this auto radio tuning control, which is clamped on the car's steering column.

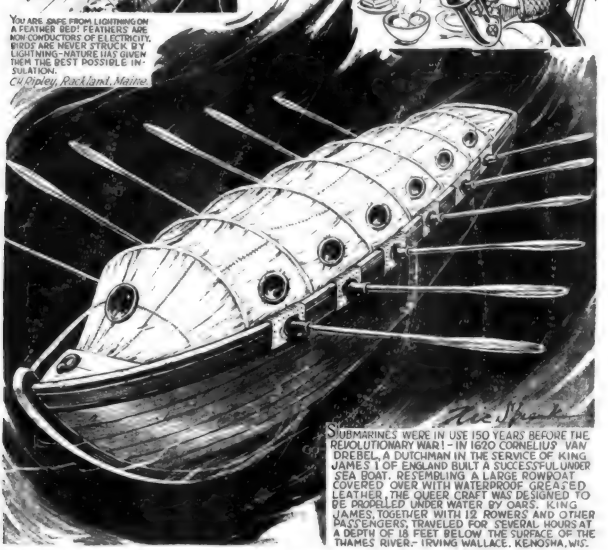
First Submarine Used 314 Years Ago; Nic Sprank in ODDITIES of Science



ANT CUT IN TWO WILL FIGHT ITSELF! WHEN THE BULLDOG ANT OF AUSTRALIA IS CUT IN TWO A BATTLE BEGINS, THE HEAD BITES THE TAIL AND THE TAIL STINGS THE HEAD.
Ray Weir, Winnipeg, Can.

EGGS CAN BE COOKED WITH SOUND! EGGS HAVE BEEN SOFT BOILED IN A FEW MINUTES BY RADIO MUSIC WITHOUT ANY RISE IN TEMPERATURE. INTENSELY SHRILL NOTES PRODUCE CHEMICAL CHANGES IN CERTAIN MATERIALS.
Steve Battista, Cleveland, O.

YOU ARE SAFE FROM LIGHTNING ON A FEATHER BED! FEATHERS ARE NON-CONDUCTORS OF ELECTRICITY. BIRDS ARE NEVER STRUCK BY LIGHTNING—NATURE HAS GIVEN THEM THE BEST POSSIBLE INSULATION.
Cal Ripley, Rockland, Maine.



SUBMARINES WERE IN USE 150 YEARS BEFORE THE REVOLUTIONARY WAR! - IN 1620 CORNELIUS VAN DREBEL, A DUTCHMAN IN THE SERVICE OF KING JAMES I OF ENGLAND BUILT A SUCCESSFUL UNDER SEA BOAT. RESEMBLING A LARGE ROWBOAT COVERED OVER WITH WATERPROOF GREASED LEATHER, THE QUEER CRAFT WAS DESIGNED TO BE PROPELLED UNDER WATER BY OARS. KING JAMES, TOGETHER WITH 12 ROWERS AND OTHER PASSENGERS, TRAVELED FOR SEVERAL HOURS AT A DEPTH OF 18 FEET BELOW THE SURFACE OF THE THAMES RIVER.- IRVING WALLACE, KENOSHA, WIS.

Win $11! Send your Oddity of Science to Nic Sprank, Modern Mechanix and Inventions, 529 South 7th Street, Minneapolis. No Oddity will be considered unless source or proof of item is included. Do not include Oddities with letters.

SCOOPS That Made Hot News

Floods, fires, riots, earthquakes—the newsreel cameraman sees and records them all. Here is the story of the big scoops that live in the annals of newsreeling.

One of the most famous scoops of all time was the "Sinking of Cervera's Fleet," right. This 1898 thriller was filmed in a back yard pool at Waukegan, Ill., with toy ships, and firecrackers for ammunition. Note mask which serves for the background.

THE story of the newsreel and its creators is the story of an amazing progress. From the early nineties down to the present day, newsreel men have striven, fought, faced disaster and suffered death in a mad, hectic race to be first to place the news of the world upon a moving picture screen.

Today the newsreeler goes everywhere—into the desert, the jungle, the arctic—to every far-flung corner of the globe. Wherever catastrophe threatens or thrilling events transpire, there you will find the man behind the newsreel camera, hot on the trail of a new scoop with which to astonish the world.

In the early days of the newsreel, production was not geared to its present state of high-speed efficiency. Transportation and communication moved at a more leisurely pace; but the spirit of competition was as keen as it is today.

The Jeffries-Sharkey prize fight of November 3, 1899, was the scene of one of the first "beats" scored by the knights of the tripod. The old Biograph company had made exclusive—and expensive—arrangements to film the battle. They had arranged an elaborate system of arc lighting and had posted a cordon of armed guards about the

Mervyn Freeman, ace newsreeler, is shown in his diving suit ready to take under water shots of the S-4. Freeman lost his hearing in one ear because of depth pressure.

NEWSREEL HISTORY

by **EARL THEISEN**

Honorary Curator Motion Pictures, Los Angeles Museum

Modern cameramen take their equipment into the front lines. Photo shows a news man in action with Japanese marines in the Orient.

With the aid of friends, however, Albert E. Smith of the Vitagraph company managed to smuggle a disassembled camera into the hall. While Biograph photographed the fight, Smith also made a negative. Just as the bout was almost over, guards noticed Smith. They charged him, but Smith eluded them, hustled his film to the laboratory, speeded up his workmen and got to the place to keep out competitive cameramen.

Photos in strip above and left show how cardboard miniature was built and fired to score a fake scoop of the sensational San Francisco earthquake by alert newsmen in 1906.

Newsreel Men Fabricate Amazing Scoops; Risk Lives for Modern Thrills

screen first. Smith made money; but Biograph, decisively scooped, was forced to charge off their expensive preparations almost as a total loss.

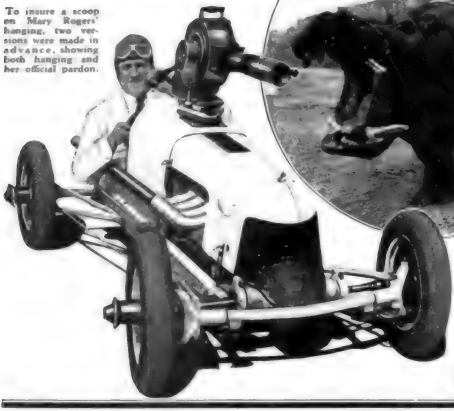
Not all of the early scoops were authentic, however. The "Sinking of Cervera's Fleet," for example, the highlight of the Spanish-American war, was solely the product of one man's ingenuity and imagination.

That man was E. H. Amet, pioneer newsreeler, who claimed to have been on the scene and actually photographed the battle. Now, however, with twinkling eyes, he relates how he made a pool in the back yard of his home in Waukegan, Illinois, built replicas of the Spanish and American vessels and then manipulated the ships in battle.

Firecrackers were tied to the ships and set off by punk held with wires running under the water out of camera lines. Thus the ships fired upon each other, clouds of smoke arose, waves rolled, and battleships sank. Although the picture was only 50 ft. in length, it brought the audiences to the edges of their seats, so realistically was it recreated. In fact, an officer who participated in the engagement said upon seeing the film, that while it was real, he wondered how Amet could have photographed the battle, since it occurred at night. And Amet explained, "I used a moonlight film and a six-mile lens."

In 1906, Biograph scored a beat by fabricating the San Francisco fire. When the first flash on the disaster came through, the manager of the Biograph Company wired a west coast representative to go to San Francisco and get a picture. But the news man was too late. With the exception of wrecked

To insure a scoop on Mary Rogers' hanging, two versions were made in advance, showing both hanging and her official pardon.



Screen thrillers constantly require new angles. This enterprising newshawk has mounted a hippo at an animal circus to get a closeup.

Piloting a racing car and manipulating a movie camera at the same time are all in the day's work for the newsreel man. This arrangement is used to film automobile races.

buildings and debris, he could get nothing suitable. That, however, did not stop Biograph. In their New York office, they had some panoramas of San Francisco. With the aid of these panoramas and some cardboard shoe boxes, they built a miniature of San Francisco on a table top. They made the city as complete as possible and then set fire to it. As the cardboard San Francisco burned, the camera recorded it! It was a scoop!

Harry Miles, who had an exchange in the fire area, managed to get some authentic pictures of the fire, although he had lost everything else. Miles hurried with the pictures to New York in order to get an early release, but under the code of the newsreeler, "Get the pictures while hot, regardless," Biograph had scored a beat to the screen by one day.

During this same time, a woman in Vermont named Mary Rogers had drowned her husband. The newspaper headlines were lurid and public opinion ran high. The Governor had been asked to intercede but there was doubt until the last as to whether or not she would hang. To protect themselves Biograph secured pictures of the

(Continued on page 132)

Newsreel DICTIONARY

Dead—*Cameraman arrived too late, or principal did not show up.*

Eggs in the Coffee—*Same as okay.*

Exclusives—*No opposition from rivals.*

Hot Stuff—*Something of national or international interest.*

In the Alley—*Poor workmanship. Film cannot be used.*

In the Box—*Getting the picture that seemed impossible to get.*

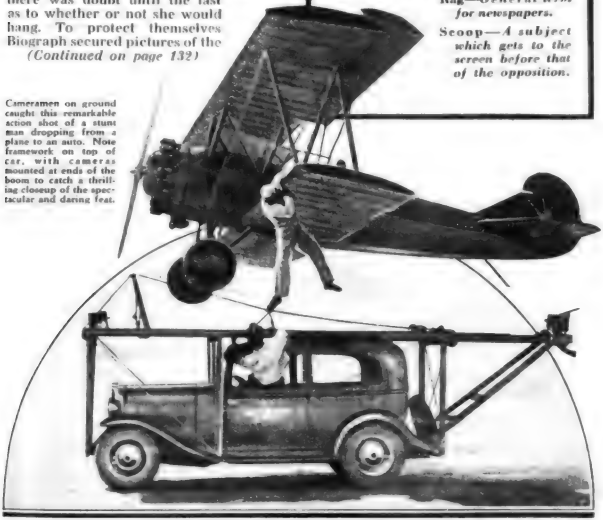
Kill the Stuff—*Photographed, brought in and not used.*

Naping a Shot—*Kidnaping, or getting a shot of person unawares.*

Poser—*Those being photographed.*

Rag—*General term for newspapers.*

Scoop—*A subject which gets to the screen before that of the opposition.*



Cameramen on ground caught this remarkable action shot of a stunt man dropping from a plane to an auto. Note framework on top of car, with cameras mounted at ends of the boom to catch a thrilling closeup of the spectacular and daring feat.

Texas Woman Operates Bird Hospital

Mrs. Shear and assistant, dressed in spotless white, give medicine to afflicted bird in operating room of Houston, Texas, bird clinic as anxious mistress seated at left looks on.

Mrs. Marjory Shear, nation's only woman bird physician and surgeon, administers anaesthetic into canary's beak before amputating leg. Potion takes effect immediately.

BELIEVED to be the only hospital of its kind in this country, the bird clinic operated by Mrs. Marjory Shear is noted for its cleanliness and modern, yet tiny surgical instruments. Shelves filled with remedies for various bird ailments line the walls of the unusual room.

Into this clinic room are brought birds with heart trouble, asthma, broken legs or wings, split beaks, and a multitude of other afflictions.

Amputations are frequent, for most people wait too long before seeking medical aid. Mrs. Shear administers anaesthetic into the birds' beaks with an eye dropper, then operates with small sterilized instruments.

Before being accepted for treatment, each bird is tested for tuberculosis and for external parasites. Next comes a dip into a delousing solution, which kills any eggs clinging to the feathers and any microscopic parasites which might be present.

Each bird patient has its individual cage which is cleansed daily. Perches are sandpapered, the cuttle bones turned, and food and water cups filled afresh. There is also a daily examination for each feathered invalid.

Tiny Lighthouse Is Night Lamp

A MINIATURE reproduction of a lighthouse, coming in either brass or nickel finish, serves as a novel table ornament in the daytime and as a handy night light or candle in the evening. A standard flashlight battery is wired to the tiny bulb at the top of the six inch high tower. A switch is mounted conveniently at the base of the tower.

Six inches high is this lighthouse night light, operated from flashlight battery in base.

NEEDED INVENTIONS

SINCE last year at this time, 62,000 patents have filtered through the United States Patent Office and over thirty thousand new inventions and improvements in old inventions have reached the commercial market. Truly this is the golden age of invention and discovery and if the inventor ever sat on the top of the heap he is doing it today. The fastest selling thing in the world is a new idea that the world can use and if the idea can make money, there is little question about price.

Our list this month involves a number of rather important items; little things which, if perfected in the right way, will bring large cash rewards to their inventors.

There is needed a cheap, pressed metal clothes line pole or support that can be made adjustable in length and that will grip the clothesline in such a way that there will be no possibility of an accident to the family washing.

Steering Baby Carriage Would Sell

Some sort of baby carriage that steers could be sold but it must be designed in such a way that it will not possess a freakish appearance. In short the carriage should have the same appearance as the carriages now in use save that the person wheeling the carriage should be able to exercise some control over the front wheels by an inconspicuous mechanism.

A cheap, invisible door check that could be sold for a dollar or less and that could be installed in the frame of a door would be one of the largest money-makers ever produced.

We still have with us the problem of picking up mail sacks on speeding airplanes. The United States Post Office is very much interested in this problem and the inventor who can solve it will be

(Continued on page 142)

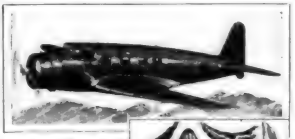
Every common item in the American home, plus an idea, means wealth to resourceful inventors. If you want to know how to secure patents or protect ideas, write the Patent Editor, 329 South 7th St., Minneapolis, Minn. Enclose a stamped, self-addressed envelope. Send no models.

Plan Weekly Air Service From New York to Moscow

CAPABLE of carrying an express load of ten tons, the new Vultee transport air liner is being considered for the inauguration of a round-trip weekly air-express service from New York to Moscow, with a stop at London. With a cruising speed of 215 m.p.h., the hop from New York to London will be covered in less than a day, and the remainder of the schedule in but ten hours more.

It is the belief of Geo. Hutchinson, president of the airline planning to operate on this route, that weekly trips can be maintained for over nine months of the year.

Though as yet passenger service is not contemplated, it will be seriously considered if the express flights prove successful.



New Vultee transport airplane developed for New York-London-Moscow air-express service, as it appeared in recent test flight over mountainous country. With low single wing, retractable landing gear, and completely stream-lined fuselage, plane has cruising speed of 215 m.p.h. At right is photo of Geo. Hutchinson, president of airline which plans to inaugurate weekly trans-Atlantic service.

Front Is Rear on Queer Omnibus

Though at first glance both ends of this English omnibus appear to be the same, closer examination will show that right end is front. Engine is mounted in center under floor.

WITH the engine mounted in the center, underneath the floor, a new English omnibus looks exactly the same from either end. The staircase to the upper deck is beside the driver instead of in the usual position at the rear end of the machine. The engine is easily reached from the side for any necessary repairs.

Rear wheel drive with standard drive shaft and differential is used.

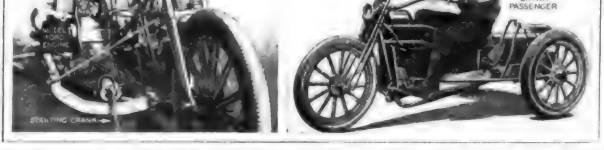
Ford-powered Motorcycle Carries 6

BY MOUNTING an old Ford auto engine on a motorcycle frame, Bradley Braden of Cuba, Illinois, has built a cycle-auto which will do 45 miles an hour, and provide room for as many as six passengers.

A two wheel drive, using a Ford rear end with the driveshaft shortened to a length of about 7 inches, is one of the unusual features. Auto and motorcycle frames are bolted together and rods run from the Ford clutch and brake pedals to the regular cycle pedals. Speed is controlled by the handlebar throttle.

Just as in an ordinary auto, there is a self-starter and reverse gear. Braden claims the cycle-auto will beat any car for pickup and getaway. The cost is very low, since only old auto parts are used.

Though dry cells are used to supply current for the ignition coils, the engine must be cranked by hand to get it started.



Neither auto nor motorcycle is this hybrid vehicle, made by bolting automobile and motorcycle frames together, and mounting a Ford engine as power unit. Top speed is 45 m.p.h. Ford differential and rear wheels are used for 2 wheel drive.

Transients Build Skyscraper Wigwams

Where Indians once roamed the shore of Medicine Lake, near Minneapolis, Minn., unemployed men have built a relief camp of modern wigwams and tepees. Photos show the odd structures which house from two to seventy-five men.

ALONG the shore of Medicine Lake, near Minneapolis, Minn., homeless, unemployed men have built one of the strangest communities in America—a white man's village of tepees and skyscraper wigwams.

Originally started as a minor relief project, the camp now covers 93 acres and is one of Minnesota's largest relief depots.

Local building and wrecking companies donate material for the structures which range from a two-person hut to a three-story community dwelling. These buildings have the customary Indian ridge poles, but the sides are covered with shingles instead of skin. The interiors are attractively equipped with rustic furniture.

Storage batteries propel this front-drive, motored chair at varying speeds up to a maximum of twelve miles per hour.

Handy Index Lists Phone Numbers

TELEPHONE numbers in frequent use are made instantly available with a new dial-type index which clamps to the instrument. Flipping a tab with the finger brings the number into view.

Numbers in frequent use are brought to view by flipping the dial tabs as shown here.

The unit is compact and does not interfere with ordinary operation.

Battery Drives Motored Chair

FREQUENTERS of west coast boardwalks are being treated to a new and novel means of transportation—a motored chair propelled by a storage battery.

Perfected by a California inventor, the conveyance utilizes the front wheel drive principle. The power plant is mounted on the yoke just over the front wheel and is back geared within an oil-tight housing. The drive is extended to the wheel itself by means of a diamond roller chain. The brake is operated by a small lever on the steering handle.

Two 13-plate auto starter batteries are said to operate the vehicle more than twenty miles per charge, at a maximum speed of twelve miles per hour. If less speed is desired, a single battery may be used without sacrificing efficient performance of the vehicle.

A special winding process on the battery motor affords a constant potential from the series battery.

Scientific Betsy Ross Grows U. S. Flag of Living Microbes

Miss Roberta Love, New Jersey bacteriologist, is shown with the novel American flag which she created from living microbes. Note the pronounced color combinations.

SUCCESSFULLY improving upon history, a modern Betsy Ross, Miss Roberta Love, of Montclair, New Jersey, recently created, in her laboratory, a novel American flag composed entirely of living organisms.

The familiar stars, stripes and blue field were formed of various microbes encountered in her work as town bacteriologist.

Tending her cultures vigilantly, Miss Love succeeded in producing an amazing replica of the national flag. Colors were represented by combining distinct orders of bacilli.

The blue field, for example, was grown from the Gram Negative Bacillus. Other bacteria, a non-pigment-forming type found in milk, were used to designate the white stripes and the stars. The red stripes necessary to complete the flag were formed from a reddish-hued bacillus which Miss Love obtained from a mountain stream.

Water Bike Aids Fly Fisherman

THE danger of entangling a leader in low-hanging branches is eliminated by an Oklahoma fly fisherman who does his casting from a water bicycle.

The device consists of the frame of an ordinary bicycle, mounted on a pair of huge pontoons. Paddles operated from the pedal sprocket propel the machine in much the same manner as a bicycle. Steering is effected by a rudder working through the handle bars.

On a water bicycle built for one, an Oklahoma fisherman goes casting without worrying about overhanging branches.

Spiked Armor on Car Routs Bears

Unwilling to take chances that park bears might swarm over his automobile, a tourist devised this protective armor.

TALL tales issuing from the west recently caused an eastern tourist to devise novel protective measures to discourage playful bears in our national parks from swarming over his automobile.

Rows of spikes driven through stout boards were mounted on hood, roof and trunk of the car—a needless precaution, according to park officials.

Mower Featured by Weed Cutter

A NEW lawn mower now on the market has a special weed-lifting rake which is a boon to gardeners. Attached to the under side of the cutter bar, the rake lifts dandelions, plantain, down grass and other weed pests to an easy cutting contact.

Rake shown under blades lifts weeds to easy cutting position.

Hunting Strange Game—the GEODUCK

IT HAS the name and vaguely similar appearance of a duck—but no feathers, wings or head. It has the alertness of land animals, but no eyes or ears. It feeds on marine organisms—but it isn't a fish. Yet there are such things as geoducks and sportsmen declare them one of the trickiest of all game animals to bag.

The geoduck, or gooey duck, is a giant clam found only along the Pacific coast near Puget Sound and the southeast coast of Africa and the neighboring island of Madagascar.

Because of its extreme sensitiveness to danger and the fact that it may be taken only at extreme minus tides, the geoduck challenges the sportsman's utmost skill.

Armed with long-handled shovels, the hunters tramp the muddy beach. Suddenly a searcher sights a geoduck, its long, hose-like neck reared above the mud, waiting for the returning tide which carries food organisms which are sucked through a tube in the neck into the creature's stomach.

Stalking the quarry cautiously, a hunter approaches; but the creature somehow senses danger and withdraws its neck just as he makes a grab for it.

Shovels swing rapidly as the men sink a shaft around the spot, enclosing it in a metal cylinder. If the hunters are lucky they may bring to light a giant bivalve often exceeding ten pounds in weight. The breast of the geoduck is creamy and tender when fried and the necks are chopped up and made into chowder.

Hunter with "bag," following successful day's stalking of geoducks, the strange shell animal inhabiting the mud flats of Puget Sound.

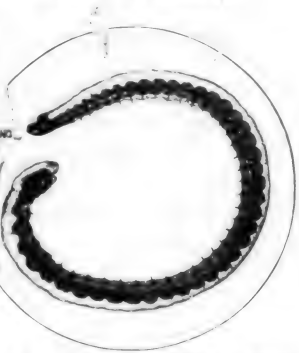
Geoduck closeup showing size of the giant shell animals. Note partly open shells, resembling wings.

Left—One of the metal containers which are sunk at spot where geoduck disappeared, to keep sand from caving in. Right—A Puget Sound hunter lying prone in the tidal mud, digging frantically with bare hands for his elusive quarry. Season on geoducks is open the year around, with a bag limit of three "ducks" a day. The geoducks are used in chowder.

Discovering Hidden Marvels

There is a jungle filled with curious animals and plants in a drop of water. The only weapon needed to explore this world is a microscope.

Here are the correct terms for the various parts of a microscope. This instrument has three sets of lenses.



The dero, a small fresh water relative of the earthworm, is one of the many animals found in microscopic jungles.

SCARCELY an environment exists that is not populated by interesting animals or plants. There are bizarre fish on the bottom of the ocean, oddly colored butterflies on mountain summits, blind and white salamanders in caves, and powerful and dangerous snakes in the jungles.

Man seeks the odd and unusual and calls it sport or big game hunting. The difficulties of reaching these strange places and the expense involved put these pursuits out of range of the average person.

But there is a jungle filled with curious animals and plants within reach of everyone. If you wish to see life in its greatest pageantry you need travel only so far as the nearest pond or ditch of stagnant water and your only weapon need be a microscope. In this microscopic world Lilliputians will put on a show for you outrivaling the jungle pictures of the movies and the adventurous tales of daring explorers.

Equipment for this work, aside from the microscope itself, is simple and inexpensive. One or more small-sized (2-4 ounce) wide-mouthed bottles with cork stoppers, some blank labels, slides and cover glasses, several pipettes (medicine droppers) and a small bottle of iodine are the sole essentials.

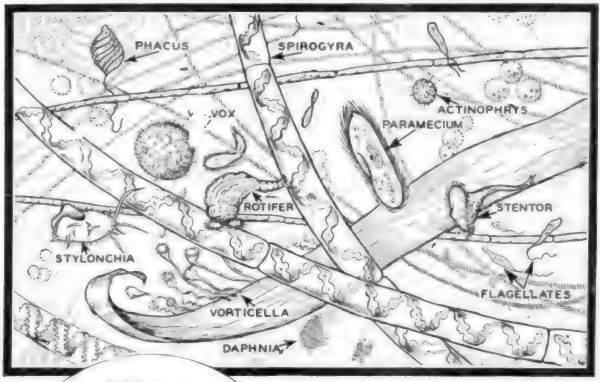
On any convenient day during the milder portions of the year, put on some old clothes and hike out into the country, visiting a marsh, pond or stream, and search out localities in which the water is more or less stagnant, the bottom covered with old leaves and other vegetable residue, and supporting a considerable variety of plant life, such as algae, the lowest group of plants, commonly known as scums and pondweeds, duckweed, elodea, and water lilies.

Secure samples of water and muck, together with small amounts of these plants from as many such places as possible. For example, take one of your small collecting bottles, well cleaned, and with the stopper in place, immerse beneath the water, holding it on the bottom of the pool in the left hand. With the right, remove the cork, poking some of the bottom muck and dead leaves into the bottle as the water rushes in. Replace the stopper, bring the bottle to the surface and label it as to locality and type of environment.

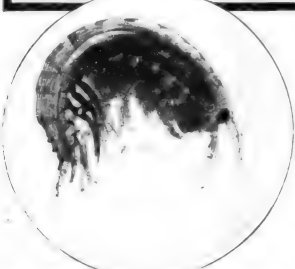
In this manner obtain some of the water adjacent to lily pads, including some cut

in a Drop of Water

by JULIAN D. CORRINGTON, Ph.D.



The wide variety of life that can be found in a drop of water is shown in the above drawing. Many other plants and animals exist in water from different locations.



Here is a microscopic relative of the lobster. Its behavior is very interesting when seen through lens of a microscope.

pieces of the lily leaves. Scrape off algae and debris from the bark or surface of a log that has lain long under water. Do not mix materials obtained from different sites, but have a separate bottle for each, and label carefully.

On the way home, watch your opportunity to secure a handful of dry hay or wisps of dried grass and should you encounter any of the large type of urn that used to be commonly seen in parks or on gateposts, the water or even the dry debris from the bottom will make a splendid addition to your study materials.

The little people you have thus collected need oxygen, just as we all do—and food. The latter requirement will take care of itself by nature's well known method of dog-eat-dog, but the oxygen you must see to for yourself by removing the stoppers from the bottles when you have lined them up on your work table. Cover each bottle with a small square of gauze, secured around the neck of the bottle with a rubber band. Clean your pipettes thoroughly, using a pipe cleaner for the barrels, and label each with a number corresponding to numbers placed on the bottles. This prevents using the same pipette for different cultures, a procedure likely to mix or contaminate the different populations.

Clean up half a dozen slides and as many covers and keep them handy for use. To mount a drop of culture, partially squeeze closed the bulb of a pipette, dip it into a bottle so that the tip of the nozzle just touches the layer of sediment or muck at the bottom of the water level. Release the bulb, sucking up some water as well as sediment and debris. Place one to two drops of this mixture on the center of a

(Continued on page 134)

Cotton Layer Applied Over Tar Saves Roads in Southland

Light weight cotton cloth being spread over road in South Carolina. Hot oil and final layer of gravel is spread over cloth membrane, resulting in smooth, long lasting road.

SPREADING long rolls of cotton cloth over newly tarred roads may seem rather foolish to many, but highway authorities of South Carolina and Texas found that this thin cotton membrane gave astonishing results. The cost of the cloth itself is low, and maintenance costs are just about wiped out by this revolutionary method of road construction. Engineers predict that soon all contracts will specify cotton membranes.

The highway is first scarified and rolled in the usual manner. It is opened to traffic and allowed to re-pack for a few days, after which it is swept clean and a prime coat of tar applied. Twenty-four hours later cotton fabric weighing four ounces to the yard is spread over the road, being held in place by the still sticky tar. This surface is immediately covered with hot asphaltic oil and then with a layer of sand and gravel.

The cotton cloth holds the road materials together, preventing any crumbling near the shoulders. Heat cracks and warping are reduced to a minimum, giving a tarred surface which is free from bumps.

New Device Thwarts Auto Holdups

Alarm signal drops into place when driver presses dash button.

THE latest anti-crime weapon is an alarm signal which reads "Help", and is operated from the dashboard.

Accosted by bandits or kidnapers, the motorist merely presses a button which discloses the sign, warning the public.

Radio Stops When Phone Is Used

NOISY radio programs cannot interfere with telephone conversations in homes having a novel, recently invented telephone-radio switch. The phone normally sets on an ornamental base; when it is lifted a little button in the center springs upward and shuts off the radio set.

The switch can either be connected in series with one of the radio set power leads to cut off set entirely, or between aerial and ground to bypass incoming radio signals.

Radio automatically shuts off when telephone is lifted off the decorative stand on table.

Music Sent Over Teletype Wires

Teletype machines send both words and music. F. H Huber, seated in telegraph office in Baltimore, Maryland, plays carillon at Century of Progress 800 miles away

SEATED at a teletypewriter in Baltimore, Maryland, a noted musician recently played a carillon 800 miles away at the Century of Progress exposition.

Engineers of the telegraph company connected up an ordinary teletype machine to a section of piano keyboard, so that as each key was depressed by the player in Philadelphia, the corresponding note was struck on the carillon in Chicago.

Carrying the experiment one step further, engineers hope soon to connect a full piano keyboard to the teletype systems. Famous pianists in some key city could then give recitals which would be faithfully reproduced on concert hall pianos in any other city having teletype service. Unlike radio broadcasts which distort or slight certain notes, teletype musical concerts would give perfect reproduction.

Swiss Engineers Develop New Double Deck Sleeping Car

SWISS railroad car builders have recently succeeded in developing a double deck sleeping car which provides each passenger with a private compartment.

Chief difficulties in construction heretofore lay in providing access to the upper deck and in the fact that one corridor served both upper and lower sections. The new car has two separate corridors, one on each deck on opposite sides of the vehicle. Short stairways at the end vestibule lead to each deck. The lower deck has 8 compartments; the upper, 11.

Despite the fact that there is ample head room (all compartments and corridors are more than six feet high) the over-all height of the new car is only slightly more than the conventional type now in general use.

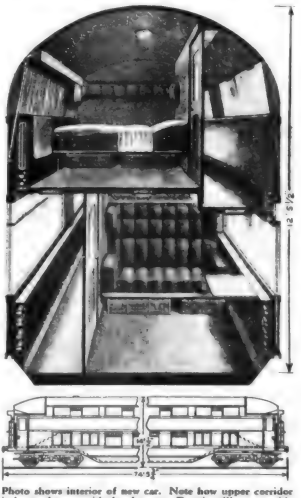


Photo shows interior of new car. Note how upper corridor is lowered to provide head room. Drawing illustrates side view with special treatment of bottom deck between wheels.

Novel Scale Computes Postage

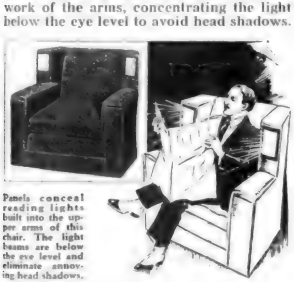
Pressing zone key gives postage on automatic scale as shown.

A NEW parcel post scale now available instantly gives both the weight and required postage for any package.

Numbered keys indicate various mail zones. When the proper key is pressed, the amount of postage is automatically registered on a slotted dial near scale's base.

Lights Are Built Into Armchair

FLOOR lamps are expected to be outmoded with a newly perfected "head light" armchair. Twin reading lamps are built into glass-enclosed panels in the upper framework of the arms, concentrating the light below the eye level to avoid head shadows.



Panels conceal reading lights built into the upper arms of this chair. The light beams are below the eye level and eliminate annoying head shadows.

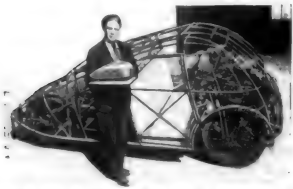
Taxidermy Creates Odd Book Ends

TAXIDERMY is the newest source of inspiration for craftsmen who are seeking decorative novelties for the home. Mounted specimens of the smaller birds and field animals are utilized in a variety of ways, such as book ends, lamp bases and wall plaques. The finished product is highly novel and makes an ideal decoration for the den or library.

In addition to serving as distinctive ornaments, the mounts are said to afford a lucrative sideline for home craftsmen.

Novel book ends for the library or den are created by stuffing and mounting the smaller birds or field animals.

Tiny Car Powered by Motorcycle Engine to Do 100 m.p.h.



Built of steel tubing throughout, this low-slung car is proof against both fire and tipping. The car's single seat accommodates four persons. Photo shows Dr. Calvin B. Bridges, the inventor, with a completed model in his hand.

DEVELOPED along the latest approved streamlines, a revolutionary automobile conceived by a California technician is expected to attain a speed of 100 m.p.h. through a specially designed motorcycle engine.

The car is to hold four persons seated abreast and is expected to average from 50 to 70 miles on a gallon of gasoline. No glass is used in construction. The windshield is made of translucent material; and the entire framework is made of steel, rendering the car fireproof.

Portable Shower Held by Suction

KNOWLEDGE of plumbing is unnecessary to install a new portable shower bath unit now on the market. The device is equipped with a powerful suction cup which clings stubbornly to any surface, however smooth.

The spray head turns within the outer part of the vacuum cup by means of a ball and socket joint, permitting the operator to direct the water flow wherever desired. A special connection is designed to fit any size or style of faucet.

The device may be used as an overhead shower within the tub, as a shampoo spray over the wash bowl, or in various other ways. The complete unit weighs less than two pounds and is furnished in various attractive color combinations.

A powerful suction cup permits this portable bath spray to be attached to any smooth surface about the house.

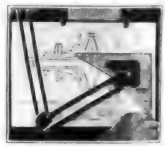
New Device Locates Buried Metal

Above—Photo shows prospector lowering the coil along a rock face to determine the presence of precious minerals. Right—A close-up of device showing coil and battery box. Electrical disturbances are transmitted from the coil to a meter. Note extreme lightness of the complete unit.

REQUIRING no technical knowledge to operate, a new detection instrument is said to be unusually efficient in locating buried metal or virgin ore. Electrical impulses, sent through a hoop-like coil, set up disturbances on a recording meter, indicating metal's presence.

Drafting Board Fits Brief Case

DESIGNED for field use, a new drafting set combines a drawing board and various adjustable attachments which permit the sketching of arcs, curves and angles.



This compact drawing set easily fits into a common brief case.

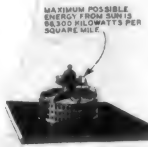
SUN'S RAYS TO DRIVE
Aerial Landing Field

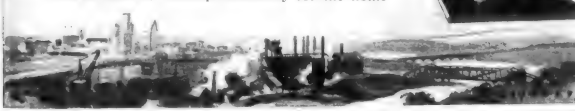
RECENT experiments in the conversion of the sun's rays into electric power have led to an unusual idea in aerial equipment. It is a dirigible that not only would get its power from the sun but also provide space for a landing field in the air.

The ordinary cigar-shaped dirigible would in effect have a slice taken from the upper half of the gas bag. This would provide a large deck on which could be mounted solar photo cells, an airplane runway, and a hangar. Planes could land on the dirigible, floating over the sea, to refuel for trans-ocean passenger service.

Another unusual feature of this design, in addition to the landing field, is the use of sun rays to power the motors of the dirigible. Scientists estimate that the sun can develop as much as 86,300 kilowatts or 115,000 horsepower per hour in an area of a square mile. Photo cells convert the sun's energy into electricity. When this can be done on a practical basis, the roof of an ordinary house can be used to develop electricity for the home.

ROOF SPACE OF ORDINARY HOME COVERED WITH SOLAR PHOTO-CELLS COULD DEVELOP CURRENT FOR APPLIANCES AND LIGHTS

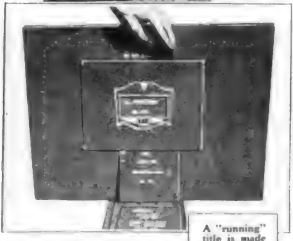




NOVEL KINKS FOR

FILMED AND EDITED
BY
ORMAL I. SPRUNGMAN

White on black titles, such as the "by line" above, can be made by using black lettering or pasting headline type from magazines or newspapers on white cards and "shooting" the title with negative film. At left—A book suitably lettered is an unusual method of making "moving titles."



A "running" title is made by cutting out the center of a title card and raising titling strip slowly while camera "shoots."

Much titling can be saved by "shooting" highway signs, names of railroad stations, and other printed descriptions found on vacation, hiking and automobile trips. Maps, pointing out routes in animated motion, are made by drawing a line for ¼", exposing few frames, and so on.

TITLING movies is one of the most interesting phases of amateur motion picture making. Title tricks, ranging from the most commonplace to the most elaborate, are within reach of every ingenious cameraman who likes to tinker. The suggestions given in this article will help you get started. Originality and inventiveness will develop many other novel titling ideas.

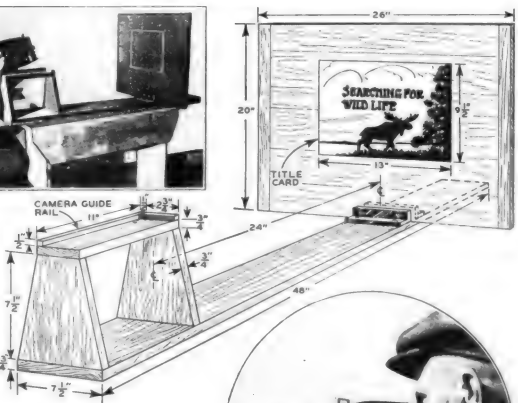
The title-board, illustrated on the next page, was built at slight cost especially for rectangular-shaped cameras, but it may be adapted for any type of camera. With it uniform titles may be produced indoors under controlled lighting conditions.

Setting Lens for Titling

The title is lettered with white ink on a 9½"x13" card of dull black cover stock, and held in position on the vertical board with thumb tacks. Since the distance from the lens to the title-card is 24", the adjustment is set at 2 feet with a lens opening f/8 and f/11. To determine the proper footage of film to use, read the title through twice slowly while "shooting" the caption. Make your titles brief and interesting — rarely longer than twenty words.

Place two 500-watt reflector-style photolamps on each side of the operator, and direct the light on the title. It is possible to "fade-in" on a title by pressing down on the camera lever and slowly turning the reflectors around until they completely brighten the face of the title. A fade-out is obtained by reversing this procedure. To secure a faster fade-in, start the camera motor running on a dark title, and a second or two later switch on the electric current. Likewise, the fade-out is made by exposing a few "frames" of film after the lights have been shut off.

TITLING HOME MOVIES



Dimensions for a home-made titling stand are given at right. It can be changed to suit different cameras. The titler is shown in the photo above. Silhouettes pasted on white cards make good title backgrounds. The title card is fastened with tacks.

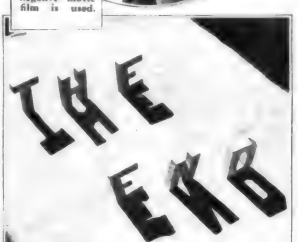
To create a "double-exposure" effect in title backgrounds, place a new roll of film in the camera, select a fitting piece of dark scenery and run off as many feet as will be needed for all the titles. Then take the camera home in your dark room, note the amount of exposed footage and rewind the reel carefully. Thread it through the camera once more and shoot the white-on-black subtitles in the usual manner. If the background is slightly underexposed, the result will be pleasing.

Wall paper samples, double-exposed for title backgrounds or lettered upon and shot direct as title-cards, give unusual effects. Because the backgrounds should not attract more attention than the wording of the title itself, mottled surfaces have a preference over "loud" designs. Similarly, photographic enlargements, magazine cover pictures and paintings may be employed for suitable title-backing.

The novel "running title," shown in one of the illustrations, is made by cutting a 2½"x5" rectangle out of the center of a 9½"x13" title-card, and drawing an artistic border around the opening. Thumb-tack this on the title-board. Next, letter the introductory title on a 6"x12" strip of cover stock. By raising the card behind the open-

(Continued on page 124)

Snapshot camera negatives can be used as title "stills" in titler above if negative movie film is used.



Wood letters, cut out with a jig saw, make attractive titles, as shown above. Vertical shots of writing in sand are also novel. Waves washing title make good "fade-outs."

BOATING AND FISHING TIPS

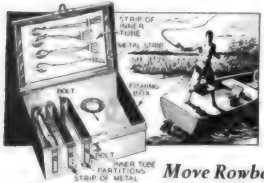
Shock Absorbers for Boat Mooring Lines

HEAVY currents swirling past docks or high waves set in motion by passing ships cause small craft tied to docks to heave and roll violently. Often the strain on the mooring lines is so great that they part, setting the boat adrift. This danger may be overcome by cutting the fore and aft mooring lines, and tieing in each a heavy spring about 1½ inches in diameter and 15 inches long. The springs act as shock absorbers when the boat starts heaving in the water, yet the boat may be tied up tightly.—J. R. Dye.

Endless Rope Holds Boat Safely Away From Pier

SMALL boats when tied by a single mooring line are continually bumped against the pier by the action of wind and waves. Even if no serious damage is done, the paint is certain to be scratched. The method offered here enables a boat to be kept some distance away from the pier, yet be instantly drawn in when needed. An endless rope is passed through pulleys at the pier and on a large anchor weight as shown in the accompanying drawing.—Herbert Arrall.

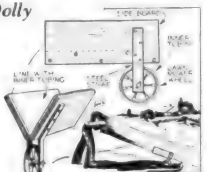
Inner Tube Rubber Pockets Separate the Plugs and Flies in Tackle Box



WHEN fishing plugs are left loosely in the tackle box, it will not be long before the paint finishes become scratched or even knocked off the plugs entirely. Flies, too, tangle with everything else if they are left loose. Individual pockets for plugs are made by cutting 3-inch wide bands from auto inner tubes, and bolting across the tackle box as shown. Metal strips inside each end of the band determine the width of the different pockets. Flies are slipped into slots in a strip of inner tube.—G. C. Harley.

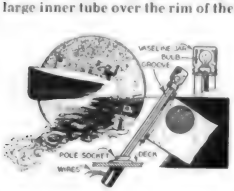
Move Rowboats With This Dolly

THE little dolly shown in the sketch will prove extremely useful to anyone having much boat dragging to do. It not only saves the bottom of the boat, but eases the job for the man moving the boat. The two side planks are bolted or screwed to a triangular-shaped backbone cut from a 2x4. Near one end of the trough iron straps are bolted, their lower ends being bent outward until parallel to each other. Holes are drilled for a short length of iron pipe or steel shaft, and an old lawnmower wheel set in place. The ends of the shaft are drilled for cotter pins. Line the trough with inner tube, and stretch a section of large inner tube over the rim of the wheel.—L. B. Robbins.



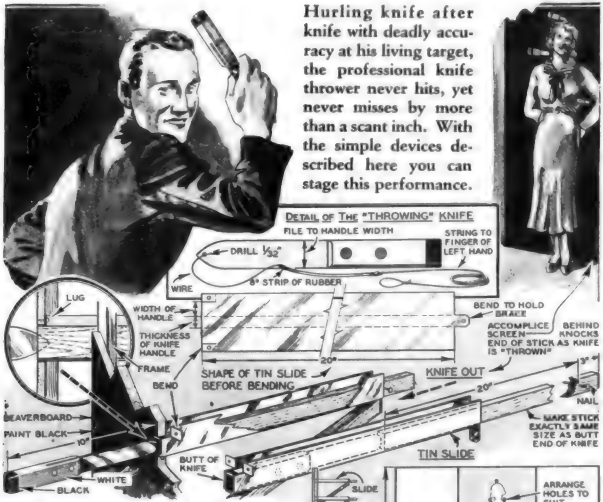
Inexpensive Stern Light for Motorboat

LITTLE more than an empty vaseline jar is needed to make this motorboat stern light. Cut a groove down the entire length of a round pole one inch or more in diameter. Mount the vaseline jar cover and an auto light socket on one end of the pole, and run connecting wires from the socket down through the groove. The bronze pole socket needed for mounting this light can be obtained from any marine hardware supply house. The groove may be filled with plastic wood.—Dave Forsyth.

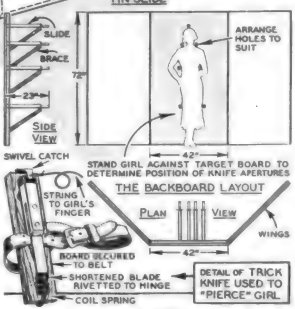


Harmless Knife-throwing Act for Amateurs

Hurling knife after knife with deadly accuracy at his living target, the professional knife thrower never hits, yet never misses by more than a scant inch. With the simple devices described here you can stage this performance.



Details of knife-throwing apparatus show how knife is mounted in metal groove. Smear glue on knife tip, then force into end of wood stick. Backboard will shake just as if knife struck it when knife is knocked out from behind.



Sketch shows how knife is mounted on board for finale of act. Girl straightens finger to pull string, release knife catch.

by JOHN P. WEST

WITH rolling of drum and crashing of cymbals the amateur knife thrower plucks a knife from his belt, balances it carefully in his hand, then hurls it with tremendous force at the human target standing against the wall. Again and again he swings his arm; with deadly accuracy he calls his shots, and the knives never miss the girl by more than an inch.

Dangerous though this stunt may seem, it can be done by anyone with guaranteed absolute safety for the living target. As a finale the performer may pretend to slip as he heaves the last knife, to drive the quivering knife through the girl's body—and the girl calmly plucks out the weapon to walk off the stage amidst the plaudits of the audience.

You won't have to throw a single knife to perform this stunt. Your knife is tied to an elastic string which pulls it into your coat sleeve just as the audience thinks you will throw it. Run the string up the sleeves

(Continued on page 120)

Choosing a GUN for UPLAND

Selection of the proper gun depends not only on the game you seek but on the section of country in which you live and whether you hunt with a dog. The advice given here will help you to choose a gun and to use it properly for hunting.

SELECTION of a gun is the first problem of the newcomer to the sport of upland game shooting. Although the single barrel repeater is very strongly in favor, the double barrel shotgun is more suited to this type of hunting. Choice depends, however, on the section of the country in which one lives and the type of game sought by the hunter.

The single barrel is often chosen because it is more popular as an all-purpose gun. Individuals selecting this type of gun not only have a number of shells at their command, but they find the firearm easy to throw into action. Having one barrel to sight over, they can swing the gun into position easily and aim better with the repeater than the double barrel.

The advantages of the double barrel gun are not difficult to establish. A typical upland gun in the double class, possessing a right barrel that is an improved cylinder and a left barrel having a modified choke, is well fitted for both close in and comparatively far-off shooting. The right barrel, throwing a pattern at fairly wide spread, is perfectly fitted for birds rising at close quarters in front or to the side of one, while the longer range left barrel, having a more compact and narrow pattern, will take the birds at an extended range. Thus the double barrel gun is in complete command of the situation.

The hunter who has a dog can use a gun of shorter range than the man who hunts upland birds "on his own."

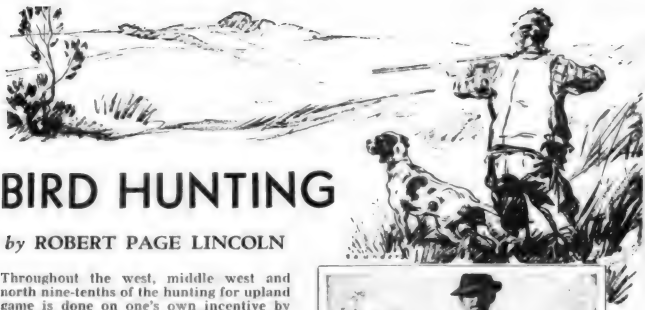
Repeater an All-purpose Gun

On the other hand the repeater with its single barrel bored for long range shooting leaves one with no choice. It is the one barrel or none at all. It is, as a rule, quite useless for close-in shooting because the massed pattern often tears the birds to shreds or causes many misses.

Throughout the western half of the country, the chief upland game that is hunted is the pheasant, the prairie chicken, the sage hen, and the ruffed grouse or partridge, all long range game suited to the choke-bored repeater. In the west the repeater is noted as an all-around, all purpose gun. The man who hunts pheasants can swing to waterfowl with his repeater and can expect to have good luck. In the winter season, he can turn to rabbits with equal confidence.

In the east and in the south a wider variety of feathered game in the upland class is sought, ranging from pheasants and partridge, down to woodcock, snipe, various shorebirds, and last, but not least of all, quail and doves. For all of these the double barreled shotgun is in its element.

There is still another factor to consider.



BIRD HUNTING

by ROBERT PAGE LINCOLN

Throughout the west, middle west and north nine-tenths of the hunting for upland game is done on one's own incentive by stalking it and by the drive method, rarely over dogs as is done in the east and in the south. Hunting over dogs makes it possible to take the game at comparatively close range, which is right in the field of the double barrel. In stalking the game it often comes up at long range. That accounts for the popularity of the single-barrel repeater in this section of the upland shooting division.

As is generally well known to shooting enthusiasts the twelve-gauge shotgun leads by far in popularity, with the sixteen-gauge and the twenty-gauge pushing to the fore ambitiously. The twenty-eight gauge is passing out of the picture and the smallest shotgun of them all, the .410, is taking its place. In the north the twelve gauge holds its own in usual fashion but in many other sections of the country, especially in the east and the south, the twenty gauge and sixteen are increasingly in demand.

20-Gauge Popularity Gains

Some years ago the twenty gauge was correctly considered rather light and ineffective, but modern inventiveness has made it one of the hardest hitting of the upland guns, making it fit for use anywhere throughout the country. The inferior, open-pattern condition of the earlier twenty gauge has now been counter-acted, with fully an ounce more of shot projected into space by more powerful powder. Such a load propelled through the barrel of an improved cylinder twenty makes a compact pattern with a deadly killing range up to thirty-five yards. The new powder and added charge of shot has pushed the twenty to the front with the result that the twelve is suffering in popularity.

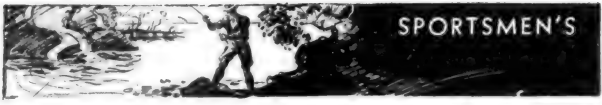
In selecting the 20-gauge it must be remembered that the full choke bore gives the gunner extreme range with a narrow and compact pattern. For average close-in wing shooting choose the improved cylinder which gives the necessary spread. With the added shot now used as compared with the inferior charge of years ago, it has everything to recommend it.

In the east and south where large and small birds are hunted the double barrel shotgun is popular. In the north and west the repeater is used as an all-around firearm.

The 16-gauge shotgun stands in between the 12 and the 20, and until the advance of the 20-gauge by reason of the new progressive powder and its ounce of shot, it looked as though the 16 would be the rival of the 12-gauge. It is now the 20-gauge that is the rival of the 12.

The .410, the smallest of the shotguns in the field, has had a sale and enjoys a popularity that is little short of phenomenal. It has been a gun that has called forth reams of admiring words, and an equal number of critical estimates. Some have dubbed it a freak, while others have proclaimed it as a revelation. The original shell as used in the .410 had a length of 2½ inches

(Continued on page 130)



How to Use Lures in the Fall, the Best Fishing Season

THE months of September and October are without doubt the best in the year for the taking of the great northern pike, the muskellunge and the pickerel, not to mention the large mouth and small mouth bass as well as other species.

During the month of August the various members of the pike family, which embraces the great northern pike, the muskellunge and the pickerel, undergo a sore mouth condition due to discarding the outer enamel of their teeth for new fangs. During this period the members of the pike specie are more or less inactive. To some extent this also applies to the bass and wall eyed pike, making August a rather poor month for fishing.

With the arrival of September, in normal years, the cooler weather of autumn, coming around the tenth of September, finds the fish again in a healthy condition and striking again, seizing the lure with a very savage action. The fish that have been fasting are now out to get their fill of food. That means good fishing in practically all waters.

Big muskies, like this one, are caught in inshore waters by casting with a large trolling spoon. Most game fish can be found in shallow water when cold weather begins.

The spoonhook lure is a chief reliance in the autumn season for the various members of the pike species. For the muskellunge the ganghook should be masked in bucktail hair, natural in color, although the red bucktail has been found to be a real killer.

Great northern pike, muskellunge and pickerel seek food in the inshore waters. The casting method, therefore, is best in taking the fish, for one can reach up into places with a cast where it would be impossible to troll.

While it is true that a large trolling spoon with a bucktail attached is best for casting for muskies, it should not be forgotten that the wobbling spoon, of any of many types found on the market, is an autumn lure that is excellent for pike. A six to eight inch gimp wire leader should be applied to the end of the line and to the spoon. This is done to prevent any possible damage to the line should the fish over-strike.

Among the plug lures useful in autumn fishing, where the bait casting rod is selected, it will be found that the wobbling lure, with red head and scooped out front is one of the best. Muskies, in September, however, are also prone to seize upon any one of several surface lures that make a commotion on the surface when the lure is jerked on the water. The best of these popfishing lures is the type having a metal collar at the head or some other device that forms a resistance against the water, thus boiling it up when it is jerked. In operating a lure of the sort, cast to the place desired, and, as you reel, give the rod tip short jerks, letting the bait rest moveless on the surface now and then. About six or eight jerks of the sort are made after which the bait may be reeled toward you in the ordinary manner.

The wobbling spoon proves to be one of the best of the wall-eyed pike lures.

For the small mouth bass it will be found that the Yellow Sally type of bass fly, tied to a No. 1-0 hook with a No. 2 gold spinner on it, proves unfailing with the fly rod. Yellow plug lures of the wobbler type are best on large mouth bass. Another excellent fall bass lure is the pork rind strip on the hook generally sold to take it.

For panfish attach a bare hook to a shaft with a No. 2 gold spinner on it. Have on hand a number of small yellow perch, four to five inches in length from which to cut your bait. Cut a flesh bit two inches in length by a fourth inch or so wide, leaving the skin on. Seat the hook at the end of this flesh strip. Use split shot sinkers, drop the lure down and start moving it by twitches of the rod tip to put the spinner in motion. It is an unfailing method of taking crappies. Other fish flesh than that from the perch does not "prove out," the perch flesh being sweet and seems to attract fish.

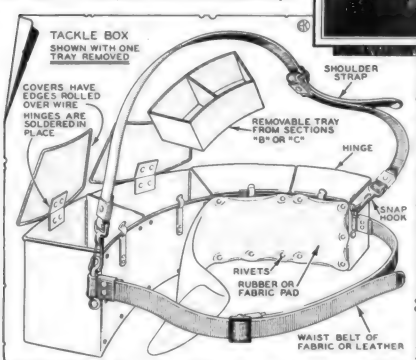
A Handy Tackle Box for the Stream or Shore Fisherman

THE roving fisherman who depends primarily on his two legs to get fish in streams or from the shore will appreciate this tackle and bait box. It is shaped to fit the curve of the body and is supported by shoulder and belt straps.

The box is built of sheet metal. Find the proper curve for your waist by cutting out experimental patterns from heavy paper. Remember that the kit is worn along the right side and back as shown in the photograph.

The length of the box is optional, although 18 inches is about right. This length will allow room for four compartments, two five inches broad and two four inches broad.

For simplicity we will call the first or front compartment "A," the second "B," and so on. "A" and "D," the first and last compartments, are four inches wide. "D" should be the full depth of the box to accommodate as many as two extra reels. "B" and "C" are fitted with removable trays to hold hooks, flies, sinkers, plugs and line. "A" is left full depth to carry bait, as it is convenient to the fisherman's right hand.

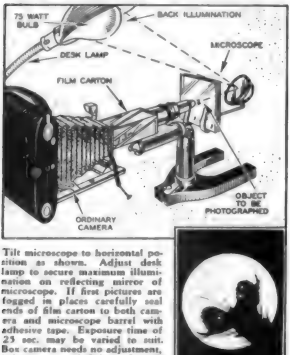


The completed tackle box, shown in the photograph above, is very convenient for fishing from shore or in streams. Dimensions for the tackle box are not given in the drawing because it is built to fit the wearer. The first compartment is used for bait, the next two for tackle and the last one for one or two extra casting reels.

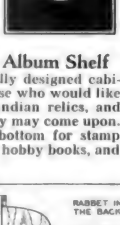
Make a separate cover for each compartment. Use a simple hinge and snap catch as shown. Solder all joints carefully. A rest for the tray can be made by soldering or riveting an "L" shaped piece of sheet metal to the sides of the compartment. If you carry more than one kind of bait the "A" compartment can also be equipped with a removable tray.

Pad the inside curve of the tackle box with rubber or fabric.

Take Insect Pictures Through Microscope with Camera



Tilt microscope to horizontal position as shown. Adjust desk lamp to secure maximum illumination on reflecting mirror of microscope. If first pictures are fogged in places carefully seal ends of film carton to both camera and microscope barrel with adhesive tape. Exposure time of 25 sec. may be varied to suit. Box camera needs no adjustment, being set at infinity. Sample photo-micrograph at right shows fly's forelegs with adhering pads.



WITH the summer season at hand, vast new fields are opening to the owner of a microscope. Insects, flowers, and pond life will beckon to these explorers of the hidden worlds about us.

Sooner or later the urge to photograph what he sees will come to the microscopy fan. By the method outlined here excellent photo-micrographs can be made with any box or folding camera.

Focus sharply in the microscope the specimen to be photographed. Use "back illumination" by directing a 75-watt lamp at the microscope mirror. With the camera set at infinity, slip an empty film carton over the eyepiece of the microscope. Push the camera lens up to this box, shutting out any light that may reach the lens from the outside. Expose the film for about twenty-five seconds.

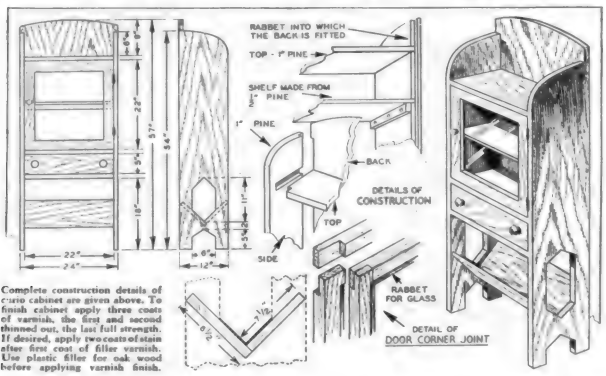
Curio Cabinet Has Album Shelf

THIS simple but tastefully designed cabinet is intended for those who would like to save curious stones, Indian relics, and other novelties which they may come upon. There is a shelf at the bottom for stamp albums, photo albums, or hobby books, and a drawer for coins.

Putting Leather Face on Hammer

WHEN no soft faced mallet is available for working on finished metal, get an 8-inch length of leather strap or belting, slit the ends, and slip over the handle and ball pein head of a machinist's hammer, covering the hammer face.

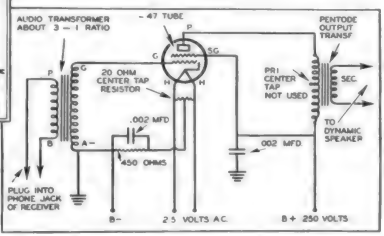
Cut leather strap as shown above and slip over ball pein hammer when pounding on finely polished metal surfaces. Hold strap in place with hand.



Complete construction details of curio cabinet are given above. To finish cabinet apply three coats of varnish, the first and second thinned out, the last full strength. If desired, apply two coats of stain after first coat of filler varnish. Use plastic filler for oak wood before applying varnish finish.

1-Tube Amplifier Brings Speaker Volume to Headphone

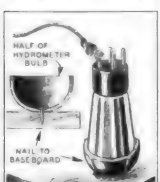
Photo of one stage amplifier using type —47 tube shows extreme simplicity of unit. Any good grade audio transformer may be used for input. Connect 5 prong socket as shown. Filament source may be either 2½-volt transformer or 6-volt storage battery with suitable rheostat. With battery, center-tapped resistor is not necessary; 450 ohm resistor is then connected to negative side of filament line.



SOONER or later short wave fans having headphone receivers yearn for loudspeaker volume. It is much better to build a separate amplifier such as this which may be plugged into the phone jack of the set when needed. Speaker volume will not be terrific, but more than loud enough for a small room.

The amplifier should operate from a separate power supply, either batteries or a power pack. It uses a single type —47 pentode tube, which requires only parts generally to be had in the radio scrap box.

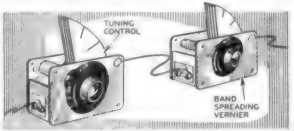
Connecting Tubes Without Sockets



HALF of an old hydrometer bulb nailed to a small wood baseboard will hold a radio tube tightly in an upside down position, when no sockets of the correct size are handy. Use tiny spring clips to make connections. Rubber balls cut in half will also do, if of the correct size.

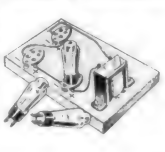
Short Wave Vernier Spreads Bands

TWO broadcast size variable condensers, when connected in series, have a capacity equal to that of a midget short wave condenser. By using one as a tuning control, the other as vernier, the band-spreading feature is obtained. Keep the vernier condenser near a fixed setting.



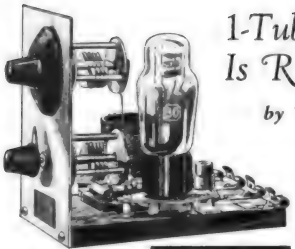
Tubes Replace Filament Rheostats

CONNECT filaments of spare tubes in series to replace resistors in dropping battery or transformer voltages for a tube filament. Many tube types may be used.



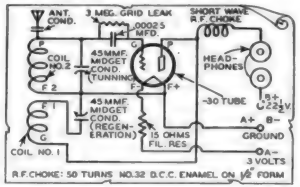
1-Tube Short Wave Marvel Is Receiver or Adapter

by **THOMAS A. BLANCHARD**



Completed short wave set weighs only one pound. It is very important that coils be wound exactly in direction shown, and connected properly. D, E, and F bring in most stations.

PLUG-IN COIL DATA			
COIL	METERS	NO. 1	NO. 2
A	18–25	7	7
B	25–35	10	10
C	35–45	14	15
D	45–65	18	20
E	65–100	50	50
F	POLICE	100	100



Circuit diagram of one tube short wave marvel. In tuning, set lower dial at point where set just stops squealing, then locate station with top dial. Reception is loudest at point where set just stops regenerating or squealing.

WHETHER used as a short wave receiver or adapter, this little set will bring in popular short wave broadcasts in Europe, South America, and Canada as well as from this country. Designed primarily for persons who have never before built a radio set, details have been kept down to a minimum, and construction simplified as much as possible.

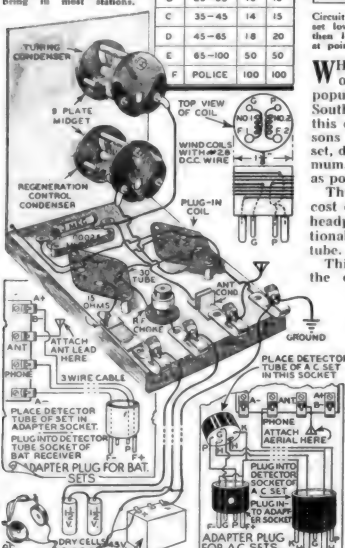
Three dollars will just about cover the cost of parts. Most everyone has a set of headphones on hand, so two dollars additional will take care of the battery and tube.

This set uses a metal panel to which the condenser rotors are automatically grounded, consequently there will be no annoying "squawks" each time you touch the dial.

Make the metal panel and the wood baseboard each 5x3½" in size. The parts are mounted on the base with wood screws. Wafer type sockets, requiring much less space, are used. The gridleak and grid condenser, of the midget type, are mounted directly under the regeneration condenser.

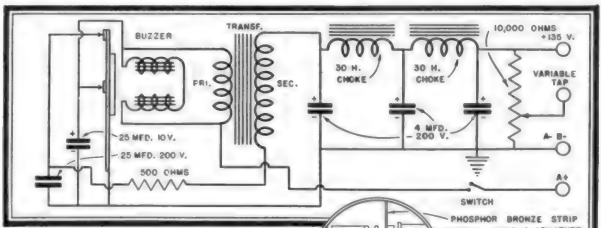
The radio frequency choke is the latest low-loss type consisting of 50 turns of No. 32 double cotton covered or enameled wire wound on a ½" bakelite form. You can make your own choke by winding the same number of turns of wire from an old audio transformer on a ½" diameter wood, bakelite or glass form.

(Continued on page 118)

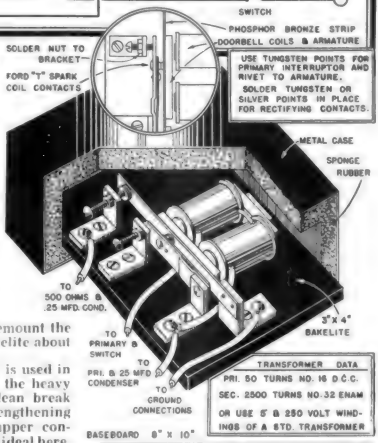


Pictorial diagram simplifies mounting and connection of set. Disconnect filament battery lead when set is not in use. Below are connections enabling receiver to be used as adapter on either all-electric or battery receivers. Ground of regular receiver is unchanged for short waves. Short antenna condenser leaves to get broadcast band.

Inexpensive B Eliminator Runs Auto Radio



Circuit diagram for complete auto radio B eliminator unit. Old audio transformers with primary and secondary connected in series will do for filter chokes. Filter condensers may be electrolytic, in one unit of 4-4-4 mfd., 200 v. rating. Ground metal case of vibrator to reduce radio frequency interference set up by sparks from motor.



THE construction of the vibrating type of auto radio B eliminator with self rectifying contacts is fairly simple, and requires only parts which are easily obtainable by any radio experimenter. Even if all parts have to be bought the total cost should not be much over two dollars.

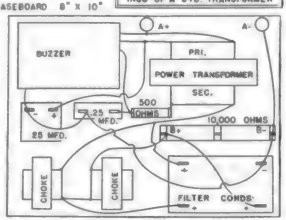
The vibrator unit is, of course, the essential part of the eliminator. Take an ordinary door bell or buzzer apart, and remount the magnet coils upon a piece of bakelite about 3"x4" in size.

A hammer break fixed contact is used in the primary circuit to interrupt the heavy 6 volt current. This gives a clean break with a minimum of sparking, lengthening the life of the contacts. The upper contact of a Ford T spark coil will be ideal here.

In order to reduce the mechanical noise of the vibrating contacts, the bakelite panel is mounted in a sheet metal case lined on the inside with 1 inch sheets of sponge rubber. Flexible wires are brought out through holes in the bottom of the box, since stiff leads would transmit some of the vibration.

The transformer is needed to step up the interrupted current. It may be wound, using the core of an old radio power transformer, or may be purchased at a radio supply house. Get a fair size power transformer with a 5 volt winding capable of carrying 2.5 amperes and a 250 volt winding.

If winding the transformer select a core having high grade silicon steel laminations.



Suggested layout for vibrator, condensers, and filter unit. Mount in neat metal case under or inside auto radio. Use separate leads to battery for B eliminator and for tubes. Eliminator will draw about 2.5 amp. from storage battery.

Radio Magician Answers Unseen Questions

Dotted lines indicate insulated wires about waist of medium which pick up signals from large insulated coil on floor by inductance. Confederate in another room reads questions softly into microphone, so as not to be heard by audience.

Any carbon microphone with two stage amplifier having output of at least two watts may be used. Most experimenters already have a suitable amplifier; others may make one from any radio receiver having at least two audio stages.

by **BILL BARTLETT**

ANSWERING unseen questions is a pseudo-mediumistic trick that can be put over by any amateur, without advance practice and with very little advance preparation. It results in the utter mystification of the audience, and unlike tricks that require skill, this never falters.

The medium and his assistant appear, and the former makes the usual spiel, telling the audience that he will answer questions they write down without seeing them.

The assistant distributes small cards and envelopes to the audience, and requests that each person write a short question they would like answered. The questions are written, the aide collects them and leaves the room. A gentleman in the audience is asked to close all the doors to the room. Putting his hand to his brow, the medium ponders a minute or so, repeats a question written by someone, and gives the usual noncommittal answer. The answers, however, are of no consequence, for the audience is wondering how he discovered what they wrote.

They do not know that the medium's billowy sash conceals a dozen turns of insulated wire. The gaudy turban, which must not be drawn too tightly, secretes a pair of small headphones. These phones are connected to the ends of the aerial wire around his waist. When the aide left the room, he proceeded to one adjoining, where an audio amplifier with a microphone input, and having an output of about 2 watts was installed. The assistant opened the questions and read them into the mike. The output posts of the amplifier, instead of being connected to a speaker, were fastened to a long insulated wire that ran into the reception room and was coiled under the rug.

MODERNIZE *your* ELECTRIC TRAIN

Change your electric train into a snappy two-mile-a-minute model of the fast Burlington "Zephyr," streamlined silver phantom of the rails, which now holds most of the world's rail speed records.

by GEORGE HARRIS

A glistening silver, noiseless bullet of the rails will be your electric train, with new bodies built according to these plans. Vestibules are of muslin, accordion pleated, treated with mixture of half gasoline, half paraffin to stiffen cloth, fitted with snap fasteners, and painted with aluminum paint.

USING the motor from your present standard gauge electric locomotive and two passenger or freight car chassis, you can change your model train into a snappy replica of the Burlington "Zephyr."

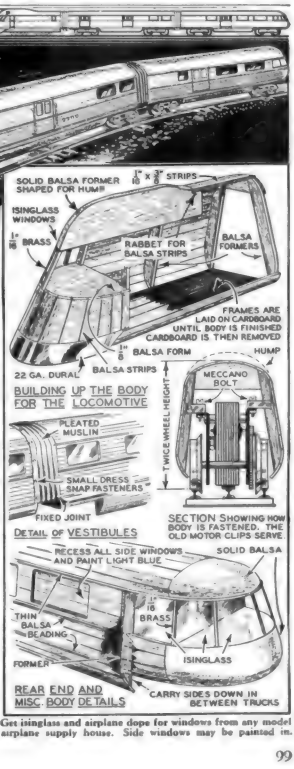
Strip the bodies from the locomotive and the two cars, and give all moving parts a thorough cleaning and oiling. Part of the charm of this model lies in its quietness, so apply a mixture of half beeswax, half tallow to the wheel journals, the bogie pins, and the coupling pins with a match stick.

Balsa wood is used throughout for the new bodies, for it can be easily glued together with ambroid, and then sanded to a perfectly symmetrical streamline.

Build the bodies upon temporary platforms of stiff cardboard. Lay out and ambroid together the formers for the body frames, set up on the cardboard, and one by one glue in place the balsa strips.

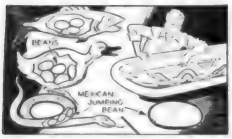
Isinglass windows on all cars are glued in place with airplane dope.

Give the balsa a few coats of any oil paint to harden it, sanding between coats. For the final coat use airplane dope mixed with silver or aluminum pigment.



Get isinglass and airplane dope for windows from any model airplane supply house. Side windows may be painted in.

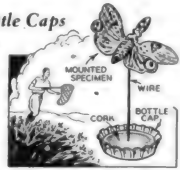
NOVELTY SUGGESTIONS



Jumping Beans Give Action to Water Toys

BATTLESHIPS, ducks, and snakes whittled out of cork, as well as light celluloid toys found in dime stores dance about on the water in fine fashion when equipped with Mexican jumping bean power. Place from one to five of these beans in cavities in the toys, seal them up again, and wait for the fun to begin. —C. O. Soats.

Mount Insects on Bottle Caps

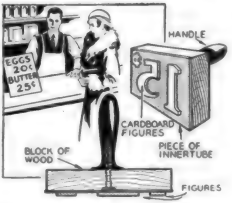


DISCARDED bottle caps can be put to good use in mounting butterflies and other insects. One bottle cap is filled with corks taken from 3 or 4 others. These corks should all be glued together and to the bottom of the cap. The corks form a cushion thick enough to hold the insect pins. The weight of the bottle cap is great enough to hold the mounted specimen in an upright position. If necessary, part of the cap may be filled with molten lead for greater stability.—E. P. Barnhart.

Thin Oil Renews Typewriter Ribbons

A FEW drops of thin oil placed on an old, dried-out typewriter ribbon and allowed a few hours time to penetrate through all the ribbon on the spool will make it write like new. Wind all the ribbon on one spool, put oil over it at night, and by morning the oil will have done its work. Of course, no treatment can do any good if the ribbon is worn full of holes.—E. H. Crook.

Cardboard Letters Print Tags or Labels



PRICE tags, cards, or small labels can easily be printed with simple home-made stamps. Cut the desired letters out of medium weight cardboard with razor blade or scissors. Printed figures on old show cards or posters can be cut out and used. Glue a square of inner tube rubber to the stamping block, then glue on the cardboard figures, being sure to reverse them.—J. C. Zimbeck.

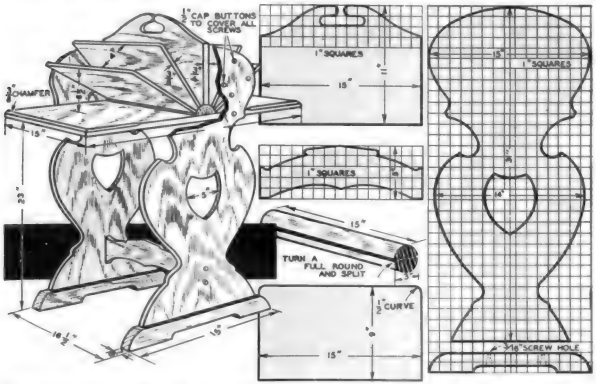
Preserve Flowers With Rubber Spray

FLOWERS can be preserved in all their natural colors for years by spraying on three or four coats of a rubber solution made by dissolving pure Para rubber in benzol. Only the pure raw rubber will do here; when applied it is perfectly transparent. The thin rubber solution is applied to the flowers with a common hand spray pump as shown at left.—A. H. Waychoff.

Weighted Bottle Cap Used as Price Tag Support

A BOTTLE cap from which the cork has been removed makes a handy and inexpensive standard for small price tags. The cap is filled with molten lead, a short wire being inserted before the lead hardens. The tag or card is then pushed over the wire as shown in drawing at right. If desired the wire may be bent into a holder into which the card may be slipped.—John C. Morissey.

Magazine Rack Also Serves as End Table



Cut-away pictorial sketch shows how combination magazine rack and end table is assembled. Wood button caps glued into each screw hole give effect of solidity to finished project. Be sure caps are well glued and tapped in tight. Design for leg, central partition and cross brace are laid out full size on paper, then traced on wood stock.

HAVING the combined features of a magazine rack and end table, this novel piece of furniture is especially suited for apartments and small homes where floor space is limited.

Select well matched pieces of any good furniture wood; it will probably be necessary to glue up stock to get the required widths. It is advisable to use two or three dowels for re-enforcement when gluing together long boards.

Make a full size paper pattern of the end piece by laying out one-inch squares and copying the squared design above. Trace this design to the ¾" leg stock, tack both leg boards together, and saw out on the band saw. The internal design is best cut out with a coping saw. Be careful to see that any tacks used are in the waste stock. The lower cross pieces or feet are cut from ¾" stock and fastened to the legs with well countersunk screws.

Well matched ¾" stock is cut to size for the table top, then the edges chamfered. Four of the magazine rack panels are of ¾" stock, while the central panel is of ¾" stock cut according to the above squared-paper design.

The half-round turned piece which keeps magazines from wedging between the panels is screwed to the table top.

The lower cross brace is laid out as a full size pattern and cut from ¾" stock. All pieces are then carefully sanded.

In assembling the project use 1½" No. 8 flat head screws throughout, except for 1¼" screws to hold the thin rack panels in place. In each case first bore a ¾" screw head pocket ¼" deep. Complete the boring with a 3/16" bit which just fits the screw shank. Soap the screw threads well before inserting.

Wood button caps of the same wood used for the table are turned to shape and glued into each screw hole. To finish, stain to the color desired and follow with one coat of shellac and two coats of rubber varnish.

Heat Enamel Paint Before Using

SET the can of enamel in hot water, and allow the paint to become lukewarm before using, to eliminate that tiresome "pull," and to have the enamel brush on as easily and smoothly as any oil paint.

Warm enamel can in hot water to thin out and eliminate tiresome "pull" on the brush.

Corn Shucks Braided Into Attractive Rugs and Door Mats

Clip off stem end of shuck, soak leaves in warm water, then strip all to same width for same rug. Braid into rope. Starting splices on same side to give rug smooth finish.

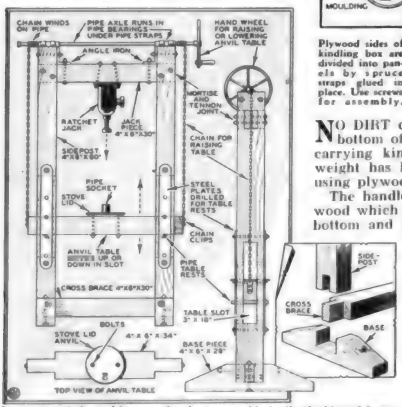
ATTRACTIVE and serviceable rugs and door mats dyed in varied colors can be made from corn shucks. The braided strands are sewed together in a circular or oval coil. Burlap is sewed to the door mats.

The corn leaves are soaked in warm water until they are soft and pliable. In braiding rugs the ends of each leaf section are folded into the rope; for mats an inch of leaf is left projecting, to give a rough surface to the finished product.

House Jack Used as Arbor Press

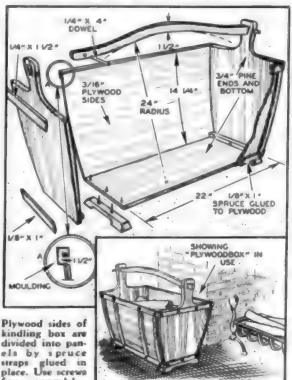
FOR pressing out bushings and removing gears from keyed shafts, there is no tool as convenient as an arbor press. Though the elaborate manufactured presses are out of the question for the average home workshop, this home-made unit, costing practically nothing, will do just as good work.

An ordinary small house jack, preferably ratchet operated, is mounted upside down on a sturdy wood framework. In order to accommodate work of varying sizes, the table of the press is made adjustable, being moved up or down by a hand wheel, and held in place by pipe rests.



Front and end views of home-made arbor press, with details of table and frame.

Carry Kindling in "Plywoodbox"



Plywood sides of kindling box are divided into panels by spruce straps glued in place. Use screws for assembly.

NO DIRT or chips can sift through the bottom of this box onto the rug while carrying kindling to the fireplace. The weight has been kept to a minimum by using plywood throughout.

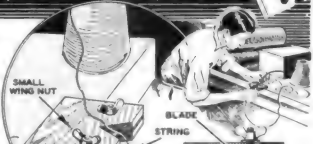
The handle should be cut from a hard wood which does not split easily, and the bottom and side re-inforcing strips from white pine. A rabbeted moulding fits over the top edge of the side panels, being held with square head upholstery nails and glued as well. Walnut stain will probably be most harmonious in the average home. Use a wood filler, then apply the stain and two coats of shellac, with a thorough smoothing down with steel wool after the first coat.

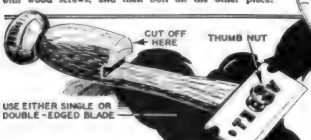
NEW USES FOR OLD RAZOR BLADES

TWINE CUTTERS

made from old razor blades are handy, but a bit dangerous when used without a guard. By mounting the blade as shown here there is absolutely no danger of cutting the fingers.

Cut V-shaped notches in 2" squares of plywood. Drill holes through the boards so that bolts passing through holes in the razor blade will locate the cutting edge about ¼" above the bottom of the notch. Fasten one of the plywood pieces to the edge of the table with wood screws, and then bolt on the other piece.





PAINT SCRAPER

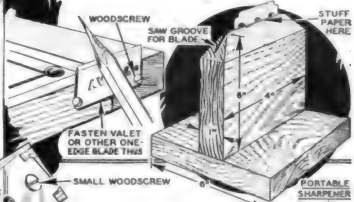
made from razor blade mounted on convenient holder is ideal for removing spots of paint left on glass after the sash has been painted. Saw off one tine of a clothespin, drill a hole through the slanted tip of the remaining tine, and fasten blade with a small bolt.

PENCIL SHARPENER

made from a razor blade finds favor with the artist or draftsman who must keep a fine point on his pencils at all times.

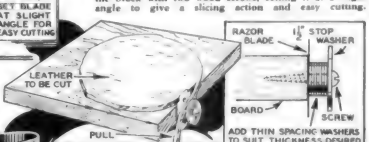
To make a handy portable sharpener, mount a 6" length of soft wood on edge on a baseboard of the same size. With a saw cut a groove in the top edge of the block, and insert a razor blade in this slot; if the blade is loose jam in tiny strips of paper with a knife.

Almost any type of blade can be used with this mounting, and new blades are easily inserted. Pencil can be brought to a fine point in a few moments, and no graphite will get on fingers.



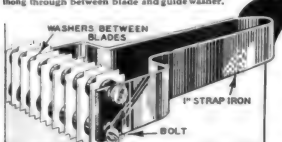
TIRE PATCH CUTTER

which cuts perfectly beveled patches is easily made from old razor blade and triangular block of wood. Cut this block to the same length as the razor blade. Fasten the blade to the block with two wood screws, setting it at a slight angle to give a slicing action and easy cutting.



THONG CUTTER

will cut any desired length of leather lace from irregular pieces of hide. Mount razor blade on edge of board and pull thong through between blade and guide washer.

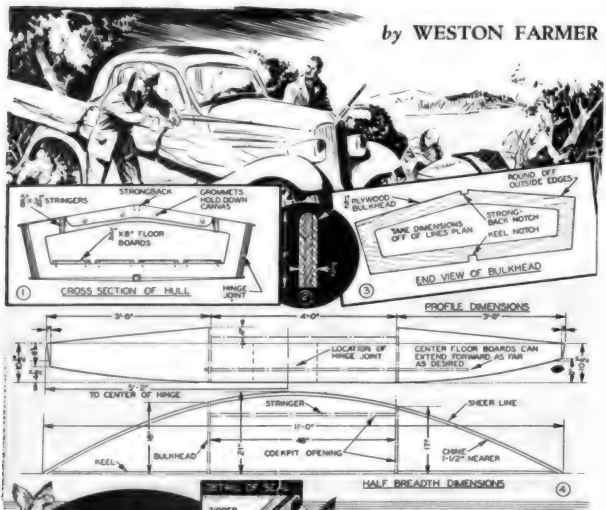


NOODLE CUTTER

made by mounting razor blades side by side at any desired spacing is handy device for any kitchen or workshop. Pounds of confetti can be cut up in a short time; crepe paper can be cut into fine strips; inner tubes can be cut into strips which are ideal for model airplane motors. In the kitchen the device is handy for cutting noodles quickly or for cross-hatching tough steaks preparatory to frying. If desired the strap iron handle may be mounted parallel to the blades.

"Fold-Tight"—a Portable Boat

by **WESTON FARMER**



Lay down the half-breadth and profile plans full size on paper as a guide in making the canvas sack. The hull cross section shows the floor boards, stringers, keel, strongback and canvas in place. Make bulkhead of one piece.

"FOLD-TIGHT" IS MODERN MECHANIX AND INVENTIONS' answer to numerous requests for a portable boat which would be carried right on the car. It is an excellent boat for duck hunters and can be easily carried on the automobile running board.

"Fold-Tight" is simple, and less difficult to build than most boats. The parts lend themselves to easy home fabrication, and the hull itself is just a heavy canvas bag, boat shaped, that your local tent and awning maker will sew up for you at small cost.

When you have finished this boat, you can collapse it, strap it to a door handle of your car and travel at your accustomed speed to your favorite hunting pass. There the boat can be set up quickly and is ready for the water.

"Fold-Tight" can be put together quickly. The paddle is held in place by brackets, as shown, or a strap on the gun rail.

for Duck Hunters

Fig. 8 is attached to the stringers as shown in Fig. 14, and serves to hold the canvas spray protector shown in Fig. 6. Make the keel longer than needed and cut to fit. Grommets hold canvas covering to wood frame.

Fig. 11 clearly shows how all wooden parts are assembled. The gun rail in

There are two major parts to the boat: the covering and the frame. The lines are laid down full size on paper from the drawings accompanying this article. Use a light ¾" x ¾" white pine batten and copy closely the lines of the profile and half breadth plans in Fig. 4. Swing the batten to a fair curve from the ends of the boat to the 3'6" marks. Join it with a good tangent curve to the flat portion in the middle of the hull.

On the half breadth plan make your paper pattern to cover both sides from the center line and take these plans to the awning maker to sew up the 14 oz. double twist canvas sack which represents the skin or hull of the boat. Have him allow plenty for the type of edge seam shown in Fig. 9. Have him sew the grommets in, and put reinforcing strips in the fore and aft decks so the zippers can be put in (Figs. 5 and 6).

These grommets and zippers are important. The grommets are used to stretch the canvas down around screw heads in the bulkhead frames and side stringers and keep the canvas taut, as shown in Figs. 1 and 13. The zippers allow you to reach the inside of the boat at the ends, there to adjust the brass stem and sides and keel and strongback pieces.

If you sew the canvas yourself, all you need to do it is to use beeswax thread and palm and awl.

Don't cut any of the wood until the canvas "pillow case" comes home from the tent maker. Fit the brass stem pieces inside each end of the sack, making sure that the fit is snug but not "stretchy." These stem pieces are of brass, rounded and peened and filed smooth, with wooden filling pieces fastened in with screws (Fig. 12).

Next cut the plywood panels for the sides. One panel 6'x4½" of ¼" birch or fir will enable you to make the panels which serve to frame the side of the boat. When cutting

(Continued on page 128)

Novelty Lamps Made With Scrap Metal

Table lamp is 21" high. Make base 8"x12"x½" high. Twenty-five-watt bulb, plain or colored, is used.

THESE attractive lamps of modernistic design are made from pieces of sheet metal which anyone can usually find in the scrap box. Lacking color, these photographs fail to do justice to these striking lighting fixtures.

Fantastic patterns of light are reflected off the gleaming copper back of the corner lamp; just as striking effects are to be had with the table lamp, where every section is enameled in a different color.

No dimensions or plans need be followed, since there are an endless number of variations of the designs shown here.

The edges of each piece are bent backward at right angles for easy soldering, after being cut to shape. The corner lamp may be made entirely of copper; this will be especially attractive when polished to the color and brightness of gold, and then lacquered to prevent corrosion.

A notched support is soldered to the back of the wall lamp, making it possible to change the lamp from one room to another at will. Two ornamental screws in the corner spaced to correspond with notches in the support hold up the lamp. The extension cord is brought out through a hole in the bottom.

The table lamp is just as easy to make. The base is merely a sheet of metal with all four edges turned; triangular shaped corner pieces are soldered to each corner of the base to stiffen it.

The fan-shaped upright part is made separately, and bolted to the base. Solder the pieces together neatly after bending back each edge. Galvanized sheet metal will do nicely for this lamp, but zinc or copper can be used if obtainable. Soldering paste will be required if the metal is at all dirty—a heavy, hot soldering iron is a necessity.

Generator Makes Powerful Arc Welder

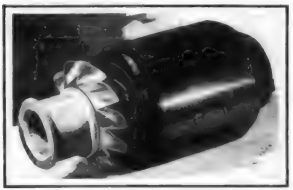
By following these step by step instructions you will find it easy to convert an old Dodge auto generator into a serviceable, low cost electric welding unit.

WELDING work requiring up to 80 amperes can be done at home with this electric welding unit converted from one of the old Dodge model "G" or "GA" generators.

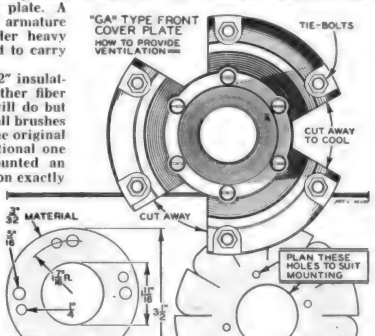
There are four main changes to make inside the generator. A special brush ring taking four brushes must be used in order to secure the proper voltage and to simplify the wiring of the welder. Ventilating holes must be cut in the front cover plate. A cooling fan is mounted on the armature to keep the windings cool under heavy load. Special field coils are used to carry the increased output current.

The brush ring is cut from 3/32" insulating material. Bakelite or any other fiber material that is strong enough will do but an aluminum ring can be used if all brushes are insulated from the holder. The original brush holders are used, an additional one being bought. Brushes are mounted an equal distance apart on the ring, on exactly the same radius as were the old brushes. First mount the brush ring on the generator, using the three regular mounting holes.

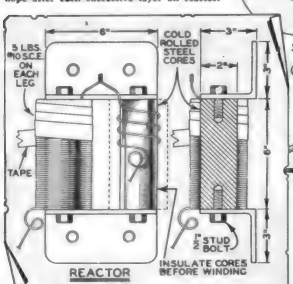
(Continued on page 125)

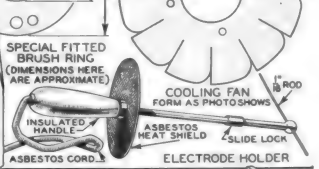


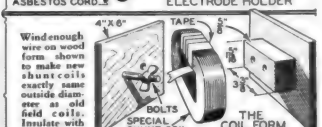
Cut cooling fan from 20-gauge sheet metal. Air can either be blown into or out of generator. Mount fan as above.



To make reactor, wind layers of insulating paper on two 6" lengths of 2" diameter cold rolled steel, then wind 5 lbs. of No. 10 single cotton enamel wire on each core. Paint wire heavily with shellac or Nitrate dope after each successive layer on reactor.

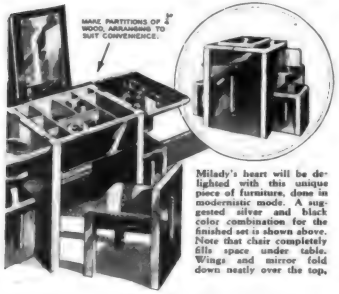






Use No. 8 flexible rubber covered or asbestos cable for electrode holder lead and grounding cable. Machine holder out of brass rod, and clamp or braze cable to it. Use either flanged or V type pulley, depending upon type of driving unit available. Model T Ford engine with governor makes ideal welder driving unit. Wiring diagram is on runover page.

Vanity Set and Chair Are Modernistic



Milady's heart will be delighted with this unique piece of furniture, done in modernistic mode. A suggested silver and black color combination for the finished set is shown above. Note that chair completely fills space under table. Wings and mirror fold down neatly over the top.

Strikingly novel in its modernistic black and silver mode is this combination powder table and low-back chair for milady's bedroom.

THIS piece of furniture will delight both the lady for whom it is built and the man who makes it, for it bristles with novelty. It is a powder table with adjustable mirror and comfortable chair when opened up; closed we have a solid piece of furniture that might pass for almost anything. Even the chair disappears into its little "stall" under the table.

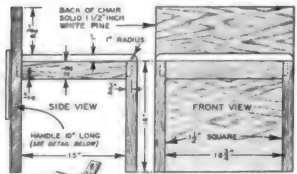
Milady will find uses for every one of the many little compartments in this vanity. No arrangement of toilet articles need be suggested here, for that would take away all the pleasure of transferring articles to their new homes.

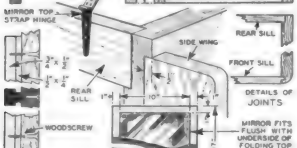
Bringing up first the subject of expense, the entire set will not cost more than three or four dollars. White or sugar pine is used throughout, since all the surfaces are lacquered anyway.

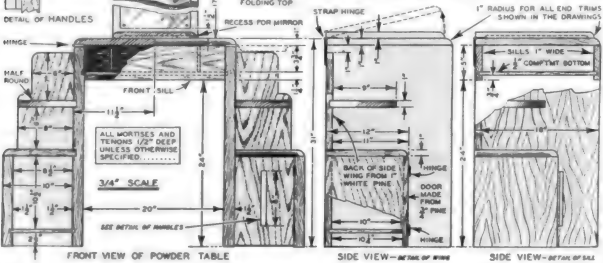
All mortised joints are held together with glue. Use only cabinet or pattern-makers' glue that comes in sheets. Let it soak overnight in a double boiler, then heat for half an hour until the liquid has the consistency of gruel, flowing freely from a brush. Nothing can pull this glue apart at a joint if it is properly prepared—the wood will break first, every time. Light pressure in clamping the pieces together is all that is needed.

(Continued on page 118)

Use white pine throughout in thicknesses specified. Drawings are exactly to scale, ¾" on this page being equal to 1 foot. Use dowel pins when gluing long boards together for panels, if sufficiently wide boards can't be had.





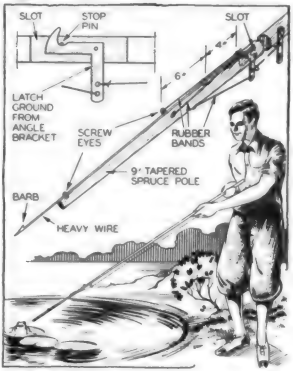


Simple But Accurate "Shooting Harpoon" Gets Turtles

ORIGINALLY designed to clear a large fish pool of toads, this sure-fire, rubber band-powered shooting harpoon has been found just as effective for frogs and turtles.

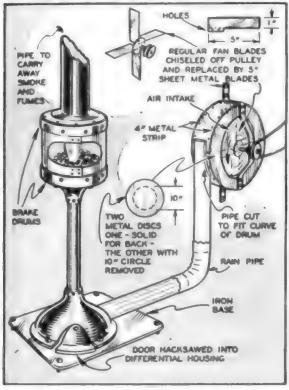
The 9-foot spruce or pine pole should be tapered from 1" at the trigger end to ½" at the point. Good stiff wire, such as from the handle of a fly swatter, is flattened at one end and carefully filed to a barbed point and sharpened on an oilstone to form the harpoon.

A loop at the other end of the harpoon engages with the trigger latch, which is pivoted in a slot near the end of the pole. The rear screw-eye guide for the harpoon must be stout enough to take the shock of impact of the harpoon.



Paint shooting harpoon green to harmonize with background. When not in use keep bottle cork on end of barb.

Forge Built of Old Auto Parts



Rivet auto body sheet metal between brake drums to form hood of forge. Chisel out top brake drum from center to bolt holes, then bend upward to form shoulder for pipe.

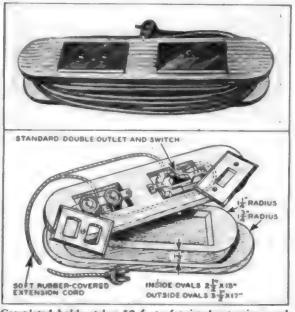
REQUIRING only old auto parts such as can be picked up anywhere at practically no cost, this simple forge with blower should appeal to the handy man.

An auto differential housing bolted to a metal plate forms the stand. An ash door is hacksawed out of the differential gear end. The grate fitting over the bearing hole at the brake drum end should have no opening larger than ½".

The blower unit is connected to the forge by rain pipe, entering through the torque tube hole in the differential.

Extension Cord Holder Has Switch

A TOGGLE switch and double receptacle are an integral part of this extension cord holder. Designed to hold 50 feet of twisted 2 wire extension cord, it will be found useful in many ways about the home. Cord is unreeled as needed, and the bayonet plug then inserted in a convenient house receptacle. The toggle switch controls all appliances which are plugged into the holder.

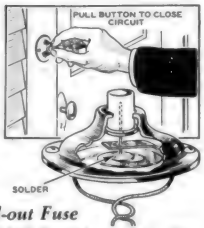


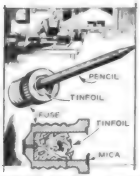
Completed holder takes 50 feet of twisted extension cord. Sketch below shows connections of receptacles to switch.

IDEAS FOR THE HOME ELECTRICIAN

Reverse Doorbell Contact to Insure Privacy

A SIMPLE method of adjusting a doorbell, so that it rings only for persons whose visit is welcome, is to reverse the contact apparatus under the button. To make the bell ring, the button must be pulled instead of pushed. Friends may be told how to ring the bell; peddlers and door-to-door salesmen can push on the button all day without result. Take the button apart and drill a hole in the upper contact strip as shown. A small nail is then soldered to the lower contact and forced into the button. Adjust so that push button is in middle position—it can be pushed in as usual, and will make the desired contact when pulled all the way out.—Rys G. Thackwell.



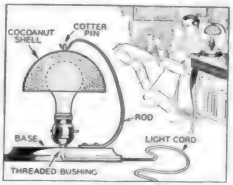


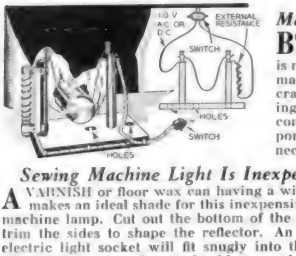
Emergency Repair for Burned-out Fuse

HERE'S a safe, quick, and sure kink that can be used in place of the usual penny when the last fuse in the house blows. Tear off the mica face of the fuse and stuff the interior with light tinfoil. This foil will carry normal loads, and will still give fuse protection by melting on overloads. When the foil fuse blows, push it in farther with a wood stick to make contact again. Replace with regular fuse as soon as possible.—Weston Farmer.

Novel Night Light Has Cocoanut Shell Shade

THE half of a cocoanut shell makes a novel and practical shade for this dainty little night light. Saw the shell apart with a hacksaw. Drill a tiny hole at the top and insert a small cotter pin. If the shade is left in natural color, it will harmonize well with either a natural black walnut or a mahogany brown base. A round base with a simple turned design, and with the bottom grooved from center to edge for the light cord, will be best. The shade holder is a strip of metal screwed to the base.—John E. Hyler.





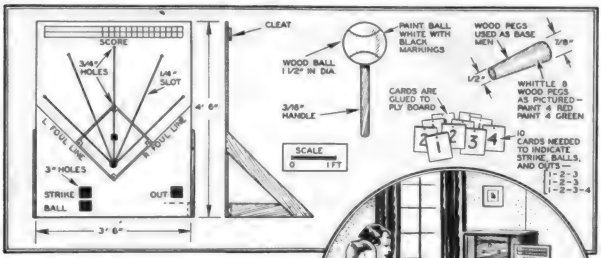
Make This Handy Electric Bottle Cutter

BOTTLES are cut off neatly when rotated in this electric glass cutter, once a light file mark is made to start the crack. Touching the hot filed mark with a drop of water will help start the crack. Wire is discarded from a 110-volt heating element until the section of cutting wire becomes red hot. The coil is then mounted on a porcelain lead-in insulator as shown, and connected to the power line.—R. Wailes.

Sewing Machine Light Is Inexpensive

A VARNISH or floor wax can having a wide mouth makes an ideal shade for this inexpensive sewing machine lamp. Cut out the bottom of the can, then trim the sides to shape the reflector. An ordinary electric light socket will fit snugly into the mouth of the can—a few drops of solder may be used if the reflector is a bit loose. A length of ordinary pipe strap or a piece of strap iron serves to mount the shade rigidly upon the head of the sewing machine. Tape rough edges with adhesive. Finish with a coat of aluminum paint.—Edward Murphy.

Animated Scoreboard for World Series Party



Lay out diamond of World Series Scoreboard as shown.

by G. EVERETT VAN HORN

NOT many will be able to see the great national classic, the World Series games, this fall, but most of us can listen in by radio. Get up a party for one or more of the games, and build an animated scoreboard to give your guests a vivid picture of the progress of the game.

Use veneer board, plywood, or heavy cardboard for the animated diamond. Diagonal braces at the back hold the board in an upright position. Make them at least 2 feet long.

Pencil in the diamond, foul lines, and scoreboard. Bore a 1½" hole directly above home base, and saw out ¾" slots running from this hole to left, center, right field, and parallel to the foul lines. At the end of each slot drill a ¾" hole. Bore ½" holes in the center of each base, and saw out a 1½" hole to indicate the pitcher's box. Three inch square holes for indicating strikes, balls, and outs are cut just below the diamond.

Outline Diamond With Paint

Paint the scoreboard white, and outline the diamond and foul lines in black paint. With India ink letter in the necessary wording and the scoreboard at the top.

Number cards made of plywood are hung over the backs of the strike, ball, and outs openings, short finishing nails being driven above each to support the squares.

Whittle out a wooden ball 1½" in diameter to represent a baseball, and paint it white, with black markings. Glue a 3/16" wood handle into a hole bored in the ball.

Whittle out 8 wooden pegs each 3" long and tapered so they will project about 1" when pushed through the base holes from the back.

All possible baseball plays can be shown on this animated scoreboard. Operator moves baseball along slots from rear.

Take your place behind the board, with the numbered cards, colored pegs, the baseball indicator, and chalk. As you get the radio returns or reconstruct the game from newspaper reports, work out each play.

Operating the Scoreboard

Before the play hold the ball in the pitcher's box. Drop it to home base for a moment for each ball or strike, placing the correct numeral over the respective opening. For a hit, run the ball along one of the five slots, depending upon the direction and type of hit. Place a peg in the base hole to indicate whether a single, double, or triple was made. For home runs, run the peg entirely around from base to base and home. As the game advances, use the pegs to indicate the positions of the base runners at any time. Between plays take time to post the strikes and balls, and between innings post the runs made on the scoreboard with chalk.

It is as exciting to operate the scoreboard as it is to watch it. Ladies who find nothing of interest in an ordinary ball game broadcast will be fascinated by this "television" method of enjoying the World Series of 1934.

How to Lay Out and Cut a MORTISE

by VERNE C. FRYKLUND
Industrial Education Division
University of Minnesota

With a little practice at this method of cutting mortises with a chisel, you can quickly make clean, close fitting joints.

THE following method of cutting mortises may be employed on any job requiring clean, close-fitting joints equal in accuracy to those cut by machine. It will be worth your while to practice this method and develop a rapid machine action. Try it once and see how fast and how well you can cut a mortise.

No time is lost in boring a number of holes or using more than one chisel, as is often done by the untrained.

Laying Out the Mortises

From your working drawings determine the thickness and width of the tenon which is to slip into your mortise. If no dimensions are given, use a 3/8" mortise and tenon for 3/4" stock, and 1/2" for stock between 7/8" and 1" thick. When rails are being fitted into chair legs the distance "C" in Fig. 1 should be from 1/8" to 1/4" regardless of the thickness of the rails. Distance "D" should be 3/16" if 3/4" or 1/2" tenons are used.

Lay out the ends of all mortises with a try-square and sharp pencil, then set the marking gauge to distance "A" and score one side of all mortises. Add the thickness of the tenon to this setting and score as before for the other side of the mortises.

Cutting the Mortises

Select a chisel of exactly the same width as that of the mortise being cut. Hold it firmly with a full grip in the left hand, keeping the bevel down. Do not release your grip during the mortising operation. The mallet is held in the right hand. Allow the second finger of the right hand to be free as a guide in placing the chisel.

Take a position behind the chisel so the eye will be directly in line with the mortise. Place the chisel, bevel down, at the center of the mortise, and take V cuts successively until the bottom of the cut is reached. Hit the chisel with solid raps, prying inward after reaching the bottom of each cut to break the shaving. Take about 1/16" cuts in hard wood, 1/8" for soft wood, and no more. Keep to the line.

When the bottom of the mortise is reached with the V cuts, turn the chisel around so the bevel is towards you and make vertical cuts.

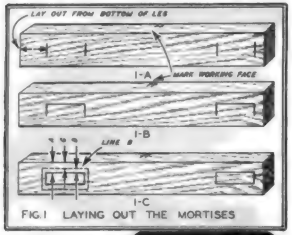
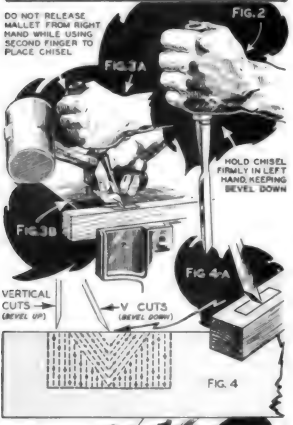


FIG. 1 LAYING OUT THE MORTISES

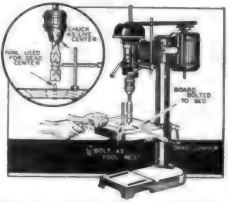


Sketches show, starting at top, steps in cutting of mortise. Set chisel straight, then drive to bottom for vertical cut.

TIME-SAVING WORKSHOP KINKS

Doing Lathe Work on the Drill Press

IT IS a simple matter to do small wood-turning jobs on your drill press. Drive a neatly sharpened nail through a piece of board, and mount on the bed of the drill so that the nail will be directly under the chuck, to act as a tailstock or dead center for turning. The chuck serves as the live center. A faceplate may be made to fit into the chuck for turning work up to 3" in diameter.—O. E. Olson.

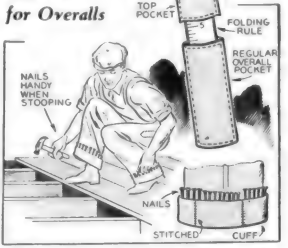


Picture Framing Vise Made of Angle Irons

FOR holding picture frame moulding while nailing or gluing, this improvised vise has no equal. Two vises of the same size, set on a bench at right angles to each other, are needed. Short lengths of angle iron are welded to each of the moving jaws, and a right angle formed of ½" angle iron pieces is welded to both of the fixed jaws of the vises. Small vises such as are sold for around twenty-five cents are more than heavy enough for this work.—Chas. C. Jensen.

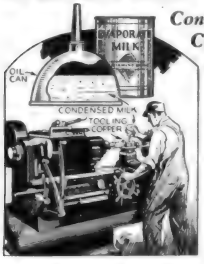
Handy Pockets for Overalls

TO PREVENT a folding rule from falling out of the regular side leg pocket in overalls, sew a small inverted top pocket just over it. Allow just enough space between to enable the rule to be slipped in and out. When nailing floorboards and working in a stooped position, a supply of nails can be carried in pockets stitched into the regular cuff of an overall leg. By dividing each cuff into three or four sections, an assortment of different size nails can be carried.—Ray J. Marran.



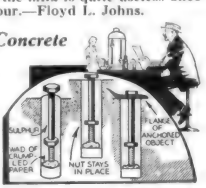
Condensed Milk Cutting Fluid for Copper

THE machining of pure copper has always been one of the most difficult of operations to perform. The tendency of copper to tear may be overcome and the copper worked like the best grades of steel by using condensed milk as a cutting fluid. Place the milk in an oil can and apply as needed. Do not use in the oil-circulating system of a lathe, as the milk is quite useless once it has become heated or sour.—Floyd L. Johns.

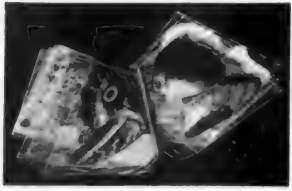


Anchoring Bolts in Concrete

MELTED sulphur gives a more permanent and secure anchorage in concrete flooring than even the best of commercial expanding bolts. Bore a hole of the desired size into the concrete with a star drill. Place the bolt in the hole head down, holding upright with pliers, and pour in the melted sulphur. To secure a finished appearance, insert the bolt head up, as shown at right.—G. C. Murray.



Butterfly Wings in Approval Books Sent to Collectors



Carefully dried butterfly wings bringing a dash of tropical glamour come to collectors mounted in cellophane-envelope pages of approval books. Butterflies must be returned intact in two days; perfect specimens are then sent to fill order.

APPROVAL sets are now available for butterfly fans as well as stamp collectors. Specimen wings of rare and beautiful butterflies from all over the world have been carefully dried and mounted in transparent cellophane envelopes. Sets of these envelopes have in turn been made up into small books. Through the cellophane col-

(Continued on page 116)

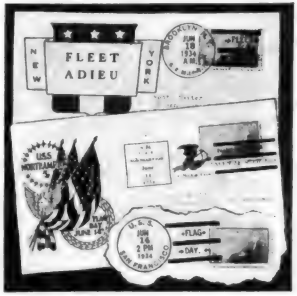
Philippine Stamps on Sale at Cost

RECENT issues of stamps of the Philippine Islands, dating as far back as March, 1931, are available at face value at the office of the Philippine Trade Commissioner, 928 Barr Building, Washington, D. C. Two centavos being equivalent to one cent in U. S. currency, it is easy to figure out how much each stamp will cost new.

A list of the stamps available may be had on request by sending a stamped, addressed envelope to the above address.

Practically complete sets of imperforate, postage due, official business, pictorial issue, and airmail stamps of Philippines are available at face value in Washington, D. C.

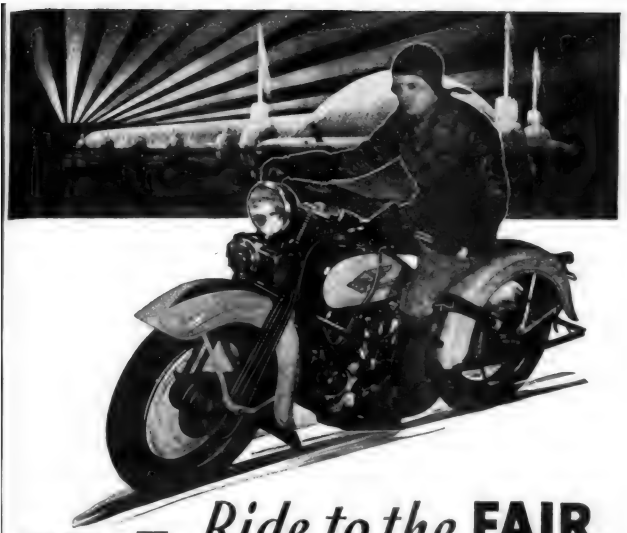
Holiday Naval Covers Are Prized



Departure of U. S. fleet from New York City on June 18 was marked by special "Fleet Departure" cancellation and two color cachet shown at top. Striking cancellations and colorful cachets used by U.S.S. Northampton and U.S.S. San Francisco, navy cruisers, on Flag Day are just below.

SPECIAL cancellations are used on most of our naval vessels on holidays and on days in which important fleet movements are made. Colored cachets, sometimes in two or more colors, are often on all mail.

Collectors can secure these colorful cancellations merely by sending stamped addressed envelopes to the different naval clerks. Announcements of special cachets can be found in any philatelic magazine.



One cent per mile is nothing unusual with a Harley-Davidson ridden solo—and that includes everything. A little more with a sidecar, but always 'way under any other means of swift travel.

Ride to the **FAIR**

SWING into the saddle of a Harley-Davidson and breeze away to Chicago and the World's Fair. No matter where you live, it's a delightful ride on a Harley-Davidson—and think of the money you'll save! It will buy many an extra thrill at The Century of Progress.

No delays in traffic parades—the zooming getaway of your Harley-Davidson leaves them far behind. No parking troubles — there's always room for a motorcycle. And every mile shows a real saving.

See your nearby Harley-Davidson Dealer today. Look over the classy '34 models, and ask about his time payment plans that make buying so easy. Send the Coupon for latest literature.

Ride a HARLEY-DAVIDSON

Mail this Coupon

HARLEY-DAVIDSON MOTOR COMPANY
Dept. MM, Milwaukee, Wis.
Interested in Motorcycling. Send illustrated literature.
Postage Stamp is enclosed to cover cost of mailing.

Name.....

Address.....

My age is ☐ 16-19 years, ☐ 20-30 years, ☐ 31 years and up, ☐ under 16 years. Check your age group.

New Canada Stamp Honors Cartier

Canada's new stamp, shown in actual size, depicts scene on board Jacques Cartier's ship just before the first landing on banks of St. Lawrence river.

SWEEPING aside the color code set up by the Universal Postal Union, Canada recently issued a 3-cent commemorative stamp in a striking deep blue color, rather than in the customary red shade.

The double-size stamp forms a beautiful tribute to Jacques Cartier, the French navigator whose explorations 400 years ago culminated in the discovery of the St. Lawrence river.

The new commemorative stamp, as well as more than 100 other varieties of Canada's postal issues, may be purchased unused at face value from the Philatelic Branch of the Post Office Department at Ottawa, Canada. A list of the stamps available is sent free on request.

University Class to Study Stamps

CLASSES in stamp collecting are to be a part of the regular curriculum of the University of Minnesota beginning with the fall semester. One night each week Gerald H. Burgess, professor in charge, will lecture on the collecting, buying, and studying of stamps for pleasure as well as for profit. Technical terms used by philatelists, and methods for classifying stamps will also be covered. The class is open to anyone interested.

Butterflies Sold on Approval

(Continued from page 114)

lectors can see both sides of the wings, and can compare with specimens in their own collections.

Unlike stamp collecting, purchases cannot be made from the approval book. The envelope book must be returned with an order for the specimens desired. Perfect, mounted specimens are then mailed out.

This new plan is intended chiefly for beginners in the hobby, who as yet do not know the varieties of butterflies by name.

New Wisconsin Covers Popular

POSTAL officials announced recently that 152,000 separate covers had been mailed by stamp collectors to themselves and to friends from the postoffice at Green Bay, Wisconsin, on July 7, the first day of issue of the Wisconsin 3-cent stamp.

Collectors sent self-addressed envelopes with cash to cover cost of the new stamps to the postmaster at Green Bay, who affixed the new stamps and cancelled them.

This cover bearing attractive two-color cachet was one of thousands mailed by stamp collectors from Green Bay, Wisconsin, on July 7, date when Wisconsin Tercentenary 3c stamp was first placed on sale. Cachet and stamp designs show Jean Nicolet approaching Menominee Indian village.

ADLETS FOR HOBBYISTS

STAMPS

CHOOSE Your Premiums! Jungle Stamps! Animal! Bird! Airmail! Triangle and Map stamps! Pick any ten from our big approval selections. Inclose 5c postage. Stamp Importers, Akron, Ohio.

50 DIFFERENT foreign stamps 5c. Corona Stamp Co., Augusta, Georgia.

LOOK! Gorgeous packet including Uruguay (Flying Horse) Airmail, Spanish Airpost, Triangle and ship stamps, only 5c to approval applicants. Royale Stamps, South Pasadena, Calif.

FREE! Three Spain Airmails or Russia Ethnographic Issue. Postage 3c. Roberts, 901T Fourth, Bay City, Mich.

ZANZIBAR! Packet queer freakish stamps from Zanzibar, Algeria, Sudan, Malay States, Victoria, Gold-coast, Nigeria, British Colonies, Souamericans. Don't delay! Don't wait. This whooping packet free for 5c postage. Gray Stampco, Dept. M.M., Toronto, Canada.

STAMPS Sent on approval. 50% discount. Fred Herzberg, 197 Grantley Ave., Elmhurst, Illinois.

HEADQUARTERS—Penny approvals, thousands of them. 500 Low price sets. Elyria Stamp Company, 437D, Elyria, Ohio.

ALBUM, 4000 spaces; hinges; 215 foreign, U. S., Japan, Airmails, 40c. Burtis Co., Saratoga, N. Y.

SENSATION Packet: Coreas, Liberia, triangles, British Colonials 10c. A. Steele, Springdale, Pa.

COINS

CANCELLED Stamps and Coins bought $10 per 1000, $600. For coins 32-page Illustrated book values, 10c. Wanted Indianhead Pennies, Rebusmc, Cohoes, N. Y.

HIGHEST Prices Paid for Indian Head Pennies. Send dime for list of those wanted. Coin Shoppe, Box 307-MM, Ottawa, Ill.

COINS BOUGHT. Send 25c for big book giving prices paid. Koin-X Change, MM-35-S, Dearborn, Chicago.

COINS, California gold quarter size 27c; ½ size, 53c. 3c piece and coin catalogue, 10c. 200 different stamps and stamp catalogue, 10c. Norman Shultz, Salt Lake City, Utah.

$5 to $500 EACH paid for Old Coins. Keep all old money. Get posted at once. Send 10 cents for Illustrated Coin Value Book 4x6. Guaranteed Buying and Selling Prices. Coin Exchange, Box 17, Le Roy, N. Y.

OLD MONEY Wanted. $5.00 to $2,500.00 each paid for old coins. Buying catalog 10c. Robert Cohen, Box 483, Muskogee, Okla.

MOVIE STARS *Enthuse* OVER THE *New 1935* MIDWEST-16

World-Wide Entertainment
Hollywood, Calif.—"Until I received my new Midwest radio I had never thought it possible to bring in entertainment from half way around the world so clearly and distinctly."
(Mme. Gitelyn-Major Star)

Amazing 9-Tube Performance
Hollywood, Calif.—"My Midwest radio has surpassed even what I thought its great makers would accomplish. . . . Its performance is all that can be humanly asked of it."
RICHARD ARLEN
Paramount Featured Player

Thrilling Foreign Reception
Hollywood, Calif.—"Last night I tuned out my Midwest 16 and I really appreciate what radio reception was. It thrills me to bring in distant foreign stations as well as local programs."
Paramount Star

Better Foreign Reception
Hollywood, Calif.—"I am quite enthused with my Midwest. Many friends who have listened are delighted with my performance. It brings in, without a doubt, the finest all-wave receiver I have ever heard."

Thrill to Unequalled World-Wide Performance with this—

Amazing NEW 1935 SUPER Deluxe 16-Tube ALL-WAVE Radio

9 TO 2,400 METERS (12,000 MILE TUNING RANGE)

30 DAYS FREE TRIAL

Guaranteed WORLD-WIDE RECEPTION!

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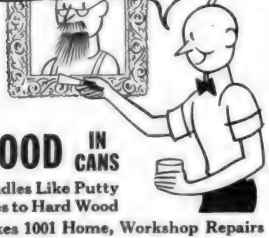

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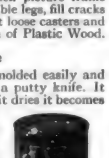

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One Tube Short Wave Receiver

(Continued from page 96)

The 15 ohm filament resistor reduces the dry cell voltage to two volts for the type 30 tube filament.

The antenna condenser is nothing more than two strips of phosphor bronze mounted directly on the wood base. The upright portions are ½" square and at least 1/64" apart.

Fahenstock clips are used as terminals. The ground, A plus and B minus leads go to the same clip, and one phone terminal goes directly to the plus terminal of the B battery. Any set of earphones will work; if you buy a new set, get a pair with a resistance of 3,000 ohms.

Using Set as Adapter

Short wave reception with loudspeaker volume on your regular broadcast receiver is possible if an adapter plug is used.

The adapter plug for battery receivers is very simple. Attach a 3-wire cable to a four prong tube base as shown in the sketches, and run these leads to the terminal clips of the short wave receiver. Place the detector tube of your radio set in the tube socket of the short wave receiver (now an adapter), and insert the four prong plug in the detector tube socket of the receiver. Attach the antenna lead to the terminal on the adapter, leave the set ground as it is, and tune in. Set the broadcast receiver on a band at which no stations are received, and tune with the adapter controls.

The adapter plug for an electric receiver is somewhat more difficult to hook up. A button type 5 prong socket is mounted inside a 4 prong tube base, and a hole drilled in the side of the tube base to bring out leads to the adapter plug. A 5 prong adapter plug is used, this going into the detector tube socket of the broadcast receiver. The detector tube plugs into the tube base socket, and that in turn plugs into the tube socket of the short wave adapter. If bus bar wire is used to connect up the socket to the 4 prong tube base, and the wires pulled down through the tube prongs, it will not be necessary to cement the socket in place. Tuning is exactly the same as for the battery set adapter.

Vanity Set, Chair Are Modernistic

(Continued from page 108)

The wings at each side of the table are hinged to fold over the table compartments. Open wings are held level by backboard.

A large mirror, set in flush with its hinged supporting board, folds down over the side table sections. Any glazier will furnish the glass cut to size, with holes drilled in the corners for the screw rosettes needed to anchor the mirror to the hinged top.

The back of the vanity chair completely fills the space under the table when not in use. A handle is fitted to the back.

Most of the modernistic furniture made today is lacquered. A suggested color combination is silver for the edges of all pieces, for the chair handle, and for the chair legs, with the rest of the set a jet, dull black.

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Knife Throwing Act for Amateurs

(Continued from page 89)

and behind your neck. To get a new knife for each throw, stick pieces of wood painted to simulate knife handles in your belt; while pretending to take out one of these, push it down instead and take the knife out of your right sleeve again.

The knives used are butcher knives obtainable for a dime each; they must have a straight handle, and the blade should come to a double point. The edges are of course dulled.

The backboard and side screens are made of wall board reinforced by a wood frame.

Making Knives Appear on Board

A clever yet simple method of pushing the knives out from behind the girl is used. Each knife that is to appear from the back of the board is glued into the end of a wood stick exactly the same size as the knife handle and three inches longer than twice the length of the entire knife. This knife and stick slide freely in a metal groove fastened to the board just back of each hole. A nail in the stick stops it when the end of the stick is level with the front of the backboard. The end of the stick and the end of the knife handle are painted black, as is the entire backboard. The knife handle is white, except for a black ring at the butt end.

The knife grooves are cut and bent out of tin. A wood brace is used to support the outer edge of each groove.

When the grooves are arranged correctly and the knives made to slide easily in their grooves, the act can be tried out. The knife thrower stands about 20 feet from the board. When he throws a knife the confederate, standing behind the board, knocks out the painted knife with a sharp tap. If this is done quickly, with drum and cymbal noise to distract attention, the audience will not be able to catch the deception.

Staging the Finale

Considerable practice before a mirror will be necessary before the amateur performer will be able to time the knife-throwing part of the act accurately enough to fool the audience. It will be necessary to adjust the length and tension of the elastic string to get it to snap the knife out of sight at the right moment. The fact that the eyes of the audience will be focused upon the target rather than upon the knife thrower will lessen the chances for failure.

If the last knife is to pierce the girl, she must wear a blouse having a double row of ruffles down the front. The knife is hinged onto a small board and strapped onto the girl underneath the ruffles. A spring forces the knife out when a catch holding the handle is released. A string tied to the catch runs down the girl's sleeve to her finger. The board must still be concealed by ruffles when the knife flies out. If the knife is wedged between two pieces of metal on the hinge, it may be pulled out entirely by the girl as an appropriate finale.

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NEW muscles grow and bulge out like magic this new, EASY way! You too can have powerful, smashing muscles, tremendous all-around strength, a deep, broad, sound chest—the kind of a build that men envy and women admire! New kind of Home Gymnasium brings out inches of hidden muscle—gives you new stamina, extra endurance and a huge storee of never-failing energy! Just look at the 23 big features you get—more than ever before offered at such a low price, by anyone, at any time, anywhere.

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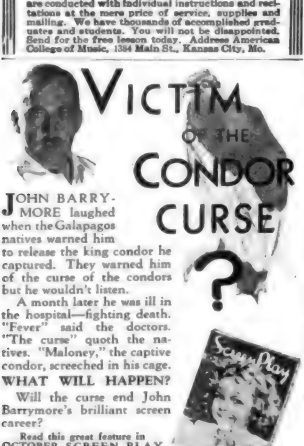


JOHN BARRYMORE laughed when the Galapagos natives warned him to release the king condor he captured. They warned him of the curse of the condors but he wouldn't listen.

A month later he was ill in the hospital—fighting death. "Fever" said the doctors. "The curse" quoth the natives. "Maloney," the captive condor, screeched in his cage.

WHAT WILL HAPPEN?

Will the curse end John Barrymore's brilliant screen career?

Read this great feature in OCTOBER SCREEN PLAY

NOW ON SALE AT ALL NEWSSTANDS

Segar's Hobbies Put Punch in Popeye

(Continued from page 46)

tized paper, instead of film, and prints are made by reflection. Many of the trick photographs accompanying this article were produced with this all-purpose camera.

Like most men who build things at home, Segar is an outdoorsman. And when inspiration fails him in the shop, he goes afield, seeking new ideas. He knows the warm satisfaction of wrapping his own fishing rod, as well as the thrill of feeling it bound and quiver to the acrobatics of a finny battler. He also likes to experiment with lures. Once in quest of salt water fish he made some jigs (artificial ocean baits) out of table silverware, simply by attaching a treble hook to the business end and a short wire leader to the handle of each implement. Barracuda and mackerel struck and were taken on the knife, the spoon, and even the fork.

Uses Sports to Speed Production

The cartoonist is also an outstanding wing shot, his enthusiasm lying with the smaller upland birds, such as quail and doves. His rise as a "skeet" shooter has been almost phenomenal. Within a month after his initial attempt at the elusive clay targets he was breaking straight "25's" with regularity. "I use sports as a whip for my work," Segar explains. "I know I can't go shooting or fishing unless I turn out my quota of daily strips and Sunday pages."

Segar has always had a great love for boats and the water. This is largely the reason why his most important original characters, namely "Caster Oyl" and "Popeye," were men of the sea. "Had my boyhood dreams shaped themselves," he says, "I might have gone to sea myself. But circumstances prevented such a career, and now I simply build my own boats and send Popeye out to do the far-away adventuring for my family.

"I was about 15 when I built my first boat out of odd bits of lumber. With it I intended to cruise the Mississippi. But the launching was heart-breaking. When I first shoved off the boat capsized. I soon found, however, that I could navigate after a fashion if I placed a big boulder in the center. This served until one day I hooked a big catfish, tipped over, and lost my precious rock. I was too far from shore to tow it back by swimming, so my first boat drifted on down the Mississippi, while I swam to shore. I felt that I had lost my best friend."

Segar's "Auto Boat"

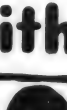
That crude boat was a far cry from the trim little "auto-boat" which Segar has just completed. And since this feather-weight, easily-portable boat is of original design, a brief description might be of interest. The "auto-boat" is 12 feet long, with a 35-inch beam and a 28-inch stern. The depth is 12 inches at the stern and beam, but slopes to 17 inches at the bow. It has 10 one-inch square spruce ribs. The floor and sides are ¾-inch spruce covered with canvas. The stern is one-inch spruce. Complete with floor boards, canvas, and paint the craft weighs

(Continued on page 129)

How to Make Money with Your Camera

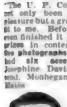
Making Money and Winning Prizes

"The U. P. Course has not only been a great pleasure but a great benefit to me. Before I had even finished it I won six prizes in contests; sold two photographs and have had six accepted."—Josephine Davis Townsend, Monhegan Island, Maine



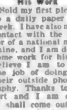
Daily Paper Buys His Work

"Held my first picture to a daily paper last week. I have also made contact with the editor of a national magazine, and I am doing some work for him. I believe I am to get the job of doing all their outside photography. Thanks to U. P. I've made a start and I am confident that in time I shall come out on top in this interesting profession."—Charles E. Warren, Jr., Woodmere, L. I.



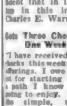
Gets Three Checks in One Week

"I have received three checks this week during. I owe you a lot for starting me on a path I know I am going to enjoy. I like the simple, understandable method in which your training is presented."—Yorke McClary, Belvidere, Ill.



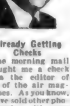
Already Getting Checks

"The morning mail brought me a check from the editor of one of the air magazines. As you know, I have sold other photographs with your assistance. And I'm only half-way thru the course. I'm extremely grateful to U."—Capt. C. H. Baldwin, Bridgeport, Conn.



His Very First Work Pays

"The picture you suggested for that national magazine brought me a check. I am looking forward eagerly to the forthcoming assignments from U. P."—John G. Nerton, Brooklyn, N. Y.



A Natl. Magazine Buys Her Work

"I thought you would be interested to know that I sold to a national magazine. Not so bad for my first sale! I really am quite thrilled with my new business. I sold a picture the other day to a magazine and another one to a manufacturers' associa-

tion. And, of course, my training is not complete."—Mrs. Olive Hastings, Dorchester, Mass.

THINK HOW MANY PHOTOGRAPHS THERE ARE IN JUST THIS **ONE** ISSUE OF THIS MAGAZINE! Then multiply that by 34,487—the number of publishers in this country who MUST buy photographs regularly. THAT will give you **some** little idea of the number of pictures being bought EVERY MONTH!

SEVEN MILLION PICTURES A YEAR—that's the conservative estimate of experts! And **who gets** the millions of dollars that are eagerly paid for these pictures? **You** in Kansas—or **You** in Oklahoma—or **You** in Maine—Yes, **YOU** literally can get **your** share, no matter where you live or what you may be doing NOW!

For the truth is that 7 out of every 10 of these pictures and snapshots are supplied by amateur photographers — working freelance, in spare time or full time—ordinary non-professional amateurs who have learned how to take pictures THAT SELL!

Millions Paid for Photos

THIS is The Age of Photographs. Your own eyes tell you *that!* And your own pocketbook will cash in on it for you! Just read the reports on this page. These are not from *professional* photographers. They are from ordinary men and women who have always liked to do a little snapshot work—and who have NOW discovered an easy way to turn their hobby into money.

For you don't have to be a great photographic expert to make money in this uncrowded, fascinating field! It isn't **technical** excellence that makes editors and publishers eager to buy the pictures you can easily produce. It's the knack of knowing WHAT to photograph, HOW to photograph it, and WHERE to **sell** it, that brings in the money! It's SALABLE and MARKETABLE pictures—full of human interest and popular appeal —that you must learn how to produce—not technically beautiful examples of photographic genius.

YOU Can Cash in on this Demand

As you can see, the people who are making money in this field are merely snapshot amateurs; and most of them live in little towns far away from any big-town happenings. For example, Norman R. Hoyt (who lives in the tiny town of Tanegrone, Missouri) says, "It sure makes a fellow feel good. This makes four photos this one magazine has accepted from me within two weeks."

The first step these people took to get into this big-money field was to send for the FREE BOOK described below. This book tells all about the simple training now given by mail by Universal Photographers, Inc. This strictly practical "how-to-do-it course of instruction was developed by many of the most successful Journalistic Photographers in America — to quickly prepare you, right at home, to make pictures that sell. And it is combined with an Unlimited Marketing Service which shows you how to sell them!

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Kinks for Titling Home Movies

(Continued from page 87)

ing while the camera is running, the reading matter is slowly exposed. This same "kink" can be used to conserve large title cards in editing "Family Album" reels by printing several descriptions on each title strip and shooting in like manner.

"Outline titles" are simple and unique. With a pair of scissors, cut out a rough silhouette, say, of a tree and a full moon. Paste these on the title-card and letter *The End* or *End of Part One* or *Part Two*, etc. on the circular moon. Be sure that all lettering and cutouts appear in an area not larger than 6"x8". To add color to commonplace titles, erect a small platform beneath the title and use artificial pines, fishing reels, dolls, etc., for appropriate "sets."

Making Titles "on Location"

Excellent titles can easily be made "on location" without title-card or board. If you are photographing along the shore of a lake, write out your titles on the wet sand with a stick and take a vertical shot of the title as the waves wash up and obliterate the inscription. A similar effect is gained by outlining the title with tiny pebbles and allowing the surf to break over them.

To show the route traveled in animated motion, mount a highway map on the title-board, then expose a few "frames" for a starter. With a crayon or broad lettering-pen and black ink, draw a ¼" line out from the home town, then expose one or two "frames" of film with a quick down-up touch of the lever. Draw another short line and repeat the process until the tour is outlined completely. When projected on the screen, the dashes will assume a lively gait.

A clear pane of glass also serves a useful purpose in original title-work. Letter with white paint or paste gummed letters on the surface and mount it vertically on a sawhorse a short distance beyond the lens. Since the focus is on the lettering, any backgrounds seen through the glass will have a "soft," double-exposed effect. The lettering can be removed with an old razor blade and the glass title used over and over again.

How to Use Negative Films

A discarded book furnishes a strikingly original idea. Print the main title of the picture on the rear cover of the book. With the binding on the left, open the rear of the book and letter the initial blurb on the first right hand page, the members of the cast on the second, the introduction on the third and "finis" on the fourth. To expose the titles, hold the camera pointing downward and shoot over the reader's shoulder as he turns each page slowly. Then fade into the opening scene of the picture.

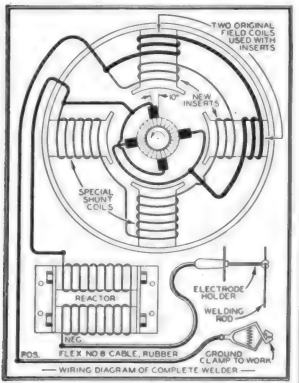
In the above "kinks" reversal film is used. For the following stunts, negative film, which is less expensive, will produce good results. In this case, titles lettered with black ink on white cards will develop out white-on-black.

Using the Eastman Cine-Titler and nega-

(Continued on page 133)

Dodge Generator Makes Arc Welder

(Continued from page 107)



Wiring diagram of converted generator, looking in from brush end of generator. Unit should be driven in counter-clockwise direction with brushes set as shown above. When winding and replacing field coils, be sure all coils go in and connect exactly as shown. 1 lb. of No. 21 S.C.E. wire is needed for field coils, 10 lbs. No. 10 S.C.E. wire for reactor coils.

Now locate the brush mounting holes so that brushes will be approximately 10 degrees ahead of the center of the poles in the direction of rotation. This angle may later be adjusted if slotted mounting holes have been made in the new brush ring.

Only two of the original large field coils are used. New insert coils, wound with No. 21 S.C.E. wire, are slipped under these coils. Number of turns used is unimportant.

Two special field coils are wound with the same No. 21 single cotton enamel wire to the size of the original field coils and inserts combined. Here also the number of turns used is not critical.

Empire cloth should by all means be used for insulating the coils, if it is available. Good results may be had, however, by wrapping cotton tape around the coils, then soaking the entire coil in orange shellac.

The reactor shown has been found best for all-around welding use. Insulate the core before winding on the wire. Follow carefully the directions indicated for the winding, to insure that the magnetic fields of the two legs of the reactor shall oppose each other. Clean off all pieces of metal which may cling to the reactor because of its magnetism.

Use a 1/16" or 3/32" welding rod such as is obtainable from most electrical supply houses. A special coated rod recently placed on the market gives unusually good results.

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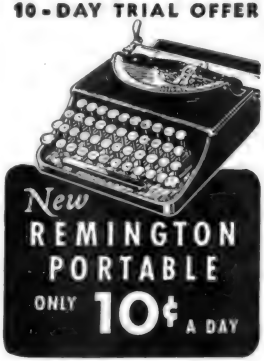

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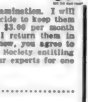

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How Army Gunners Hit Targets

(Continued from page 63)

The temperature of the powder must also be considered. Powder charges are stored in air-tight containers, and an attempt is made to keep the magazines at 59 degrees throughout the year. However, in war time these ideal conditions may not be possible. Since warm powder burns faster and increases the muzzle velocity of the shell, a ten degree temperature change will cause a difference of 300 yards in distance traveled.

Allowing for Earth's Rotation

When throwing a baseball or shooting a rifle you consider the earth as a stationary object—something that will not roll out from under you; but the artilleryman must remember that the earth turns. With the same charge and elevation a 16-inch gun, located at the Equator, will shoot 350 yards farther when pointed due west than when aimed in the opposite direction.

To destroy a definite target, the gunners must rely upon information furnished by the spotting crew. These crews are stationed at observation posts, called base-end stations, which are part of the equipment of all fixed base batteries in our system of permanent fortifications. The base line of a 16-inch battery in Panama, for instance, is nine miles long. Observers at these stations are equipped with telescopes mounted over a graduated dial. These are called azimuth instruments.

Having picked up an approaching ship, the observers track it through the telescopes, and at a time signal a reading is taken at each station. This reading, called the azimuth, is telephoned to the plotting room, where a miniature range is laid out on the plotting board. Two arms, the same proportional distances from the gun as are the base-end stations, are moved to the reported azimuth, as shown on a dial at the edge of the board. Where these arms cross a mark is made—the position of the ship. Subsequent readings are made by each station every 30 seconds, and these new positions, connected by a line, show the speed and course of the ship.

Computing the Set Forward Point

Having obtained the range and direction of the target, and already having computed the wind, density, earth's rotation, and other variables, an officer sets various slides on the range correction board and obtains the ballistic correction, or the amount of elevation that must be allowed for these variables. Another officer computes the set forward point —the spot where the ship will be at the moment it is desired to fire the guns. This set forward point, with the range officer's data, is sent to the range percentage corrector, where the actual elevation at which it is desired to set the gun is computed. This range is flashed on a dial that can be seen by the gun pointer, or is transmitted to him through a headphone.

In the meantime the variables are computed for their effect on azimuth. The angular

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How Army Gunners Hit Targets

travel of the target is allowed for, and these items are compared with the actual azimuth to the set forward point on the deflection board. The result is the corrected deflection, which is flashed on another dial that may be seen by the gunner. Since it takes 85 seconds for the shell to travel the required distance, the gun is fired at exactly that interval before the ship reaches the computed set forward point.

It is seldom, however, that these intricate calculations, made by several men, and in only a few seconds, will be entirely correct. It is therefore necessary to spot the effects of the fire in order that proper adjustments may be made. Spotters at the base end stations therefore watch for the splash of the projectiles and phone them in to the officer handling the spotting board.

Spotting From an Airplane

This method of locating the target and correcting errors by watching the splashes works excellently up to 10 miles in peace time target practice, but would be useless if the hostile fleet laid down a smoke-screen to hide its approach. It would then be necessary to do the spotting from an airplane.

The first thing the airplane observer must do is to locate the target so that the initial shots will fall close enough to be spotted from the plane. When accurate maps and marine charts are available the plane flies on the far side of the target until the ship is in line with a prominent landmark on shore. The azimuth to this point is radioed to the plotting room, where a line is drawn on the plotting board chart. An azimuth on another point is obtained, and another line is drawn. The intersection of these lines marks the approximate location of the ship.

The plane then flies in the same direction as the ship, while the observer takes a compass reading of its course and estimates its speed. The time having been accurately noted for these reports, the ship's course is plotted and a set forward point selected for firing the first shot or salvo. The exact time this shot will be fired is radioed to the plane so the observer may be watching for splashes, for under battle conditions it will be normal for the observation plane to be maneuvering violently to avoid hostile planes and anti-aircraft guns.

Clock Method of Spotting

The clock method of spotting is ordinarily used. The observer superimposes an imaginary clock over the ship, with the bow at 12 and the stern at 6 o'clock. A splash appearing a quarter mile off the port beam would be reported as 400 yards at nine o'clock. This point would be noted on the plotting board, and correction made for range and deflection as with baseline spotting. Set forward points would be computed from the original data furnished by the observer until it became apparent from the spotting that the reported course and speed of the ship had been in error. A new course and speed would then be computed for future shots.

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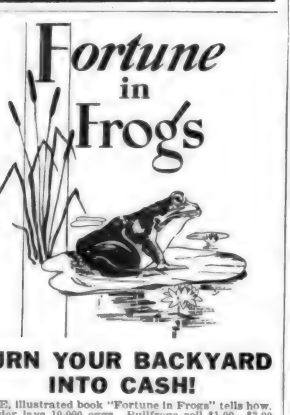

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A Portable Boat for Duck Hunters

(Continued from page 105)

the side panels, leave the ends overlapping in the middle portion of the boat after you have cut them to the outline of the inner edges of the canvas which comprises the boat's side. Round off the edges of the wood. This is to keep from chafing the canvas. With the middle ends of the sides overlapping at the point termed "hinge joint" fit up the joint sockets (Fig. 11). These are made of plywood on both faces, and there is an oak block in the middle of the same thickness as the plywood. The two faces are riveted through this oak block with ⅜"x¼" rivets. Put a burr over the rivet, after drilling the hole, and nip off the end of the rivet as closely as possible. Then it is ready for peening. Otherwise the rivet will upset and split the wood. With the ends of the plywood sides overlapping, and the hinge block pressed close against the sides, it will be an easy matter to gauge and mark the place to saw off the ends of the planks so they will fit into the mortise.

Cutting the Plywood Frames

A cross section of the plywood frames is shown in Figs. 2 and 3. These are of ½" stock, and are cut from solid pieces, or can be built up out of straight lumber, using plenty of screws to lock the joints together. The frames are held in place along the plywood sides by little plywood cleats (Fig. 13) ⅛" thick, which readily lock the frame in place, yet will give easily so it may be taken out.

The keel is simply a piece of 1¼"x1¼" spruce of the right length to spring in a neat bow from the front stem piece to the aft stern piece (Fig. 11). It will take a little cutting and fitting to get this length, but once you have it, through trial and error, the job of making the keel is done. No fastenings are needed—it simply springs into place. It is held by the keel notch in the frames.

The strongbacks are pieces of spruce or other wood 1¾"x1¼" square and long enough to reach from the stem piece sockets to the frames (Fig. 11). Solidly butted up against the stem pieces, the bulkhead ends of the frames are notched and mortised as the details show.

Two stringers, 4' long, are fitted with dowels (Fig. 10) that slip into holes in the bulkheads. These stringers form the cockpit of the boat.

Construction of Flooring

The floors are doweled, the ¼" dowel being driven in a snug fit in the frame, and entering a 5/16" hole in the floor board. The floors are of ⅜" spruce, and may run forward of the front frame to accommodate the length of your feet. Do not make them too long, for remember that all the wooden parts must go inside the canvas bag, with the exception of the paddle and the keel, when the boat is folded.

The lazyback is best made, as indicated in Fig. 13, out of ½"x4" spruce, cleated in back. You may want to hinge it in the middle

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A Portable Boat for Duck Hunters

so that it will fold, but it is not necessary. Make or obtain a cushion for the seat.

A boat of this kind is best handled with a double blade paddle.

By installing the gun rail in Fig. 8, the cockpit can be covered with an apron, as shown in Figs. 5 and 6, which has a zipper in it to draw up around the hunter. This gun rail is held in place by bolts and wing nuts as shown in Fig. 14. All of the frames, the demountable sides, the side stringers and other parts can be contained in the sack when the boat is taken down, and a couple of straps will wrap the whole thing up in a bundle which can be stowed easily on the running board. The weight of the boat is approximately 45 lbs. It will hold a 285 lb. man with 100% buoyancy left in reserve.

For a folding boat, the canvas needs some treatment to keep it satisfactorily tight, that is, after continued use. For the first three or four times used, there is enough dressing in the canvas to make it waterproof. But after the canvas has been wet and dried again, it will become more and more limp and open unless special preparation is made. The best one for treating the canvas is as follows: Dissolve as much paraffin in five gallons of gasoline as is possible. Soak the canvas in the gasoline until it is all evaporated. This will waterproof the canvas. If it is desired to make the boat permanent instead of folding, the outer jacket can be doped with a couple of coats of airplane dope to shrink the canvas, and then it may be painted like an ordinary canoe.

Segar's Hobbies Put Punch in Popeye

(Continued from page 122)

exactly 57 pounds. It is distinctly a one-man boat but will readily carry two persons on quiet water. As the name indicates, the craft is made expressly for transporting on the top of an automobile.

Segar has also built numerous radios and other electrical novelties. He frequently experiments with electrical and mechanical, and with electrical and photographic combinations.

The cartoonist's home is a monument to his originality as a builder. He designed the house and did much of the interior finishing with his own hands. Some of the furniture, too, is the result of his own handiwork. The house has one outstanding feature, in particular, which should appeal to all men. While it is two stories in height, all of the usual rooms of a home, seven in number, are downstairs. The entire upstairs is mainly one large club room, approximately 45 feet by 40 feet in size. In one corner is a study where the cartoonist does most of his work. Another section has been apportioned off as a photographic and painting studio, next to which is a dark room. In the main lounging area are pool and billiard tables which not infrequently serve as work benches in an emergency!

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Choosing Gun for Upland Hunting

(Continued from page 91)

and carried ⅞ ounce of No. 7½ shot. Patterned at 30 yards it placed over 60 shot in a 30-inch circle. The shell has now been increased to a three inch length carrying ¾ ounce of No. 7½ shot. At 30 yards this shell will put something like 165% more shot in the target than was ever possible with the 2½ inch shell. The selection of either a .410 or a 20-gauge shotgun for actual shooting in the field means the enlisting of an actual killing weapon, not a mere toy, as stated. For the shotgun user new to the game, a gun of the sort is especially recommended, in that these guns are light, well balanced, and devoid of that energetic kick that so many hunters detest.

Must Know Bird's Habits

Now turning to the use of the gun. Without a doubt there is a science to wing shooting. That one is born to be a good wing shot is untrue. Training, and training alone, will accomplish results. Knowledge of the habits of the bird hunted is essential in any branch of upland wing shooting. Unless this knowledge is made use of, and the shooting is dovetailed with this knowledge, the wing-shooting novice is doomed to failure.

Does the shooter know the habits of the quail? The manner in which this little feathered sky-rocket takes the air is a study in itself. How about the prairie chicken? It differs in its rise and flight from that of the partridge, just as the pheasant differs from any of the others. Know your game and you will be above the average wing shot.

Handle Shotgun as a Rifle

Do not believe that you cannot miss with a shotgun because you have a broadside at your finger tips. Follow up your shooting with the feeling that you are shooting, not with a shotgun, but with a rifle. Such concentration will help your aim and make you clear-eyed and alert. You will utterly forget about a whole handful of pellets that are to be sent forth, aiming to make a fictitious one count. This waives aside all carelessness.

Writers on wing shooting have failed to make plain one point on which hinges much of the success of the sport. Most feathered game rise with a confusing thunder of wings. Whether nature meant this as a protection is uncertain. Its effect, however, is certain. The intruder, invading the game cover is taken off guard, becomes flustered, and for a moment remains inactive. This instant or so permits the bird to get away in safety before the gunner has time to swing his gun into action. If he does get into action, being more or less startled, the chances are he will shoot wild. Unless the shooter overcomes the startled feeling and swings his gun into action instantaneously with the rise, he has still much to learn about hunting. Do not fail to shoot and merely stand watching the game disappear. Shoot even though you shoot wild. Otherwise it will be found that holding one's fire becomes a habit.

The amateur wing-shot must educate himself to the knack of throwing his gun to shoulder and swinging the same to cover the

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Choosing Gun for Upland Hunting

bird he is to pick off. Too many shotgun shooters are so slow on the swing and lining up as to make impossible a shot quick enough to take the bird out of the air. To educate oneself on the swing and lining up is, therefore, a necessity. This can easily be done by marking an object and swinging on it and lining up. Bring the gun up from the left side and in a sweep bring the muzzle of the gun around to line up the knot. Mark another object out of the corner of your eye, lower the gun, swing and line on that. Thus by glimpsing one object after another, get the knack of speedy and easy swinging and lining up. Continual practice at home, in your basement for that matter, will make it possible for you to acquire a speed in coming up, and an accuracy in bearing full on the object. Trapshooting, of course, is an improved method of becoming an excellent wing shot.

Pick Out One Bird in Covey

The amateur in wing shooting inevitably makes the mistake when wing shooting of sending his broadside just anywhere in the general direction of the birds. The best and surest way of making a kill is not to concentrate on the whole covey that rises before you, but to pick one individual bird and seek to take that bird.

There are many aids to effective wing shooting, and some certain rules that must be observed. One of these is to keep the sun behind you, and never in front of you. It is not always possible to do so, but by planning the path of your hunt, especially when hunting over dogs, this is an excellent idea. The most ideal place to hunt is in a swale with a hill rising to either side of you. The tendency of the birds will then be to work up the swale, following its trend. In such a case you get the straightaway shot, best on pheasants of course, since it offers a large mark, and hardest on the quail, since in the straightaway the bird presents the smallest area of its body to the eye. On quail the quartering bird, veering to right or left, as the case may be, affords the best shot.

Leading Varies With Birds

To attempt to lay down rules with regard to leading any manner of upland bird is open to question. If the birds rose the same at all times, and under the same rate of speed, there would be some possibility of charting the various flights and ascertaining how much a lead must be given the bird you are hunting. But every bird offers a different puzzle to be solved. The best advice that can be offered is to intercept the flight with the shot so that the bird will head into it.

Whether you are hunting quail, partridge, pheasant or any other upland bird in this and the shore bird class, you must make a practical study of the habits of flight, and do your shooting in accordance. Unless you make this study, your chances of acquiring a hit, and making the grade in wing shooting becomes limited.

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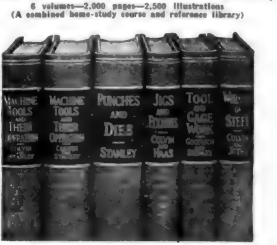

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Scoops That Made Newsreel History

(Continued from page 73)

prison, a description of the hangman and of Mary Rogers. They then proceeded to make two versions, using doubles—one showing her hanging and one showing her going to freedom. They were ready to score another scoop.

Today, this same method is used to get news to the screen while it is hot. Elections and other events, where the final outcome is doubtful, are made in two versions prior to the happening. That answers the question of the audiences, who go to a theatre a few minutes after a football game and see the announcement of the victorious team.

Newsreelers in the Trenches

During the late Sino-Japanese conflict, Mervyn Freeman, one of the modern camera aces, accompanied the 36th Royal Japanese Guard in battle. Where the fighting was the thickest, he and his Akeley camera could be seen. The films were rushed to the first steamer crossing the Pacific. At San Francisco they were loaded on a New York plane and in little more than a fortnight the stirring battles of Chapei and Kiangwan were viewed by excited audiences in New York theatres.

In all "hot" news, the talking and sound is added later. That is because it is impossible to carry sound equipment on the many set-ups on which a newsreel cameraman perches. It would be impossible to carry sound equipment over high girders or through dense crowds. After the film is synchronized and "made up" for the screen, it is rushed to key theatres throughout the United States and then later to all parts of the world. Starting out with the largest theatres in the United States, a newsreel finally reaches the smaller theatres in about thirty days.

The Center of the Newsreel World

New York is the center of the newsreel world. It is like a giant octopus of news, whose tentacles reach the four corners of the globe. Here the news editors reign supreme. They know practically everything that is happening in all parts of the world. Different men are assigned to key cities and all their activities are known at the home office. When a big story breaks, the nearest cameraman is immediately assigned. If the news is hot enough a "special" newsreel is made up by each of the companies. Then there is a race to the screen by the competitive reels.

When the first East-West Atlantic flight broke, Ray Fernstrom, the Paramount newsreeler, was in Montreal. The papers had played up the fliers as lost, then finally came a flash that they had landed on Greenly Island, off Labrador. Immediately every available newsreel resource was concentrated in an effort to get to the fliers first. Ray Fernstrom won through to a scoop! Even though his competitors chartered planes ahead of him and got the breaks, through a bit of foresight on Fernstrom's part, he bought up all the gasoline available. Thus the competitors had planes but they had no

(Continued on page 142)

Uncle Sam's Secret Tunnel System

(Continued from page 34)

connected by means of a tunnel that usually leads into the basement of the building.

Postal authorities are reluctant to reveal details of operation of the tunnel system. It is understood that in the larger postoffices observers are always on duty because of the great amount of valuable mail handled. In the smaller postoffices a regular observer is not usually stationed. It is said that a postal inspector arriving in a town can enter the tunnel, take his place in an observation room, and watch proceedings in the building without the knowledge of the public, employes, or even the postmaster. In this way persons in the building are never certain when they are not being watched.

The observation posts of this tunnel system are installed where they can not be noticed by the casual eye. They may be built between the walls or in the ventilating system of the building. The observers ordinarily peer through narrow slits, although dummy air registers may also be used.

In the new $10,000,000 Post Office Department building in Washington it is understood that there are at least a dozen secret posts for observers. It is said they have been so ingeniously concealed that only a few officials know where a single one is located.

Most postal employes know of the observation posts, but none knows when he is being watched. Knowing that they may be watched, the employes avoid any temptation to tamper with the mail they handle or to tip off underworld characters on the movement of valuable mail. This secret tunnel system in addition to fingerprinting all employes is Uncle Sam's best safeguard against robbery of his millions of trusting postal patrons.

Kinks for Titling Home Movies

(Continued from page 124)

tive film in the camera, place a black-lettered title on cellophane in the title-card slot, then pick out a fairly light background and photograph out-of-doors. When developed, the title will come out white on a "fuzzy" background with dark shadows appearing light.

With this same Titler, insert a half-sized title-card in the slot and shoot the inscription in the usual manner. Then rewind the film in a dark room and reshoot against a cloudy sky. Negative backgrounds will give your titles plenty of atmosphere. Black paper cutouts, silhouetted in the title-card slot, give realistic effects when placed in a natural setting.

For "snap-shot" backgrounds place a sheet of rough-surface sensitized paper in a cut-film holder, and, using the projector as an enlarger, make a copy of the desired "frame." The shading on the finished print will resemble a negative. Now letter with black ink on the face of the print, place in the Cine-Titler and expose with negative film for proper footage. The developed strip of film will reveal white lettering on a natural photograph.

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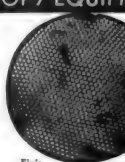

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Hidden Marvels in a Drop of Water

(Continued from page 81)

slide, lying flat on the work table before you. See that some of the debris is included in the water on the slide, but avoid any thick clumps, removing such with a needle if encountered. Add a cover glass by the method described last month for making whole mounts. Place the slide on the stage of your microscope, keeping slide more or less level so that the water will not flow out from under the cover. Either do not use the spring clips at all, or see to it that they do not come in contact with the cover, else they will draw out the water and mess up the slide.

Use a moderate amount of light and adjust microscope for work with the *low* power lens combination. Looking to the outside of the tube, run it down until the lower lens—the objective—is within a quarter of an inch of the cover glass, then look into the tube and very slowly turn the focussing knob toward you until the material on the slide comes into view.

Three Types of Microscopic Life

And here before you is the real Land of Lilliput, swimming with life.

Three types may be singled out for mention here. First, the ciliate protozoans, by far the most numerous and interesting.

They travel rapidly through the field of view, propelling themselves by lashing movements of the small but numerous cilia or hair-like protrusions from the cell wall. Some of them are anchored by stalks and a few are colonial, living in attached groups.

Many forms of microscopic life will develop if the wisp of hay brought back from your collecting trip be placed in a jar of tap water which has been allowed to stand for two days so as to exhaust excess oxygen. Cover the jar with a glass plate and stand it near a window, in light, but not in direct sunlight. Examine specimen slides every day after the first two or three and note the many forms which appear, rise to dominance, then decline.

Studying the Struggle for Life

Toward the end of the life of this hay infusion microcosm, a second type of high interest will develop and reach a climax—the rotifers. Some of the commoner types have cement glands in the tail by which they anchor this appendage and then move the head end around through a series of circles, casting about for food.

A third conspicuous type includes several of the microcrustacea, tiny allies of the crabs and lobsters, and belonging to the same great group as the insects.

Nowhere may you observe the struggle for life under more intense conditions than in a drop of pond water or hay infusion, nor with greater ease and convenience to yourself. No chapter of microscopy is more interesting than a voyage via the microscope to the Land of the Lilliputians in a drop of water.

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Story of the Great Lakes Carferries

(Continued from page 39)

arise on Lake Michigan which defy the most gallant efforts of the stout-hearted crews. On October 22, 1929, the old carferry, *Milwaukee*, was caught twenty miles off shore in a terrific storm. Cars broke from their moorings under the savage buffetings of the giant waves. The *Milwaukee* put about and attempted to run for shelter. As the wheel spun over, the ship lunged awkwardly into the trough of the pounding seas, the cars left their tracks to pile against the side of the vessel and the *Milwaukee's* doom was sealed. The shifting weight capsized the vessel and she plunged to the bottom, carrying 49 men and 30 loaded cars to destruction.

Crashing Lake Michigan's Ice

By virtue of their power and hull construction, carferries on Lake Michigan are formidable ice breakers. Their blunt bows are designed to lift up and over the ice and crash through with their weights. When ice packs are otherwise impassable, it is a common practice to run stern first and "drill" a channel with the double propellers. When the ice is at its worst, usually from January to March, carferries clear port in pairs so that one may aid another, if icebound. Occasionally they are imprisoned in the ice for a week.

Harbors on Lake Michigan invariably consist of inshore lakes and rivers, connected by dredged channels, protected by "arrowhead" breakwaters. The breakwater entrances are comparatively narrow and "aiming" for the gap in high winds and seas is a hazardous process. In the northwest gale of February 9, 1933, the carferries *Grand Rapids, Pere Marquette 21* and *Ann Arbor No. 5* crashed against piers at Grand Haven, Ludington and Frankfort, respectively. But as a rule pilots prefer to brave the perils of the open lake rather than run the risk of missing a harbor entrance.

Navigating by Dead Reckoning

Although the advent of the radio compass eliminated many strandings, the primitive method of determining courses by dead reckoning still prevails. Railroad cars carry varying amounts of heavy machinery. For this reason, navigating compasses are thrown off adjustment from six to eight points. Courses are reckoned by ranging the ship with a physical object when clearing port.

When "running wild," or pressed for speed, carferries cross the lake three times in 24 hours. The revenue for loaded cars is generally $25 and returning empties is $15 each. A modern carferry costs $1,500,000 to build and nearly $1,000 a day to operate. Each has a crew of fifty-two men. Above the car-decks are accommodations for one hundred passengers, including sleeping and dining quarters.

Interesting is the fact that in 1931 the flagship *City of Flint* of the Pere Marquette carferry line traveled over 100,000 miles to establish a world's record. However, this all-time mark was broken by the North German Lloyd liner, *Europa*, the following year by a small margin.

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30x5.25-20	2.95	1.15	30x5	3.65	1.35
31x5.25-21	3.25	1.15	32x5	3.75	1.45
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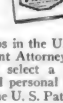

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Fleets Conquer Alaskan Wastes

(Continued from page 52)

Lieut. Col. Arnold, one of the most experienced flight officers of the Army Air Corps, was accompanied by 30 men, including three majors, four captains, eight first lieutenants, and four second lieutenants. The men amused themselves while in the air by broadcasting their own radio programs from the ships. One of the men played a harmonica, while others chimed in with songs and stories.

When leaving cities the Army ships took off in javelin formation, groups of threes with the tenth plane closing up the last triad. This is a useful war formation, as all ships can concentrate fire on any attacking plane. After reaching open country the fliers flew in echelon or extended V formations, popular for long, tiring flights.

Submarines on Longest Maneuver

The Navy flight, made with 12 PM-1 flying boats of the type that recently flew non-stop to Hawaii, covered a total distance of 7,700 miles from San Diego to Dutch Harbor. Three aircraft tenders accompanied the planes, serving as advanced bases for fueling, engine overhaul and supply. The Army supplied its squadron by boat, rail and air. Riding the Navy's leading flying boat was Lieut. Commander James M. Shoemaker, head of the squadron. The flight was made under the direction of Rear Admiral Alfred W. Johnson who followed the planes aboard the *Wright*, flagship of his Pacific aircraft base force.

The longest of the maneuvers was made by Submarine Division 12. The six submarines cruised over the identical route used by the Navy planes, then turned south through the Pacific from Alaska to Pearl Harbor, Hawaii. From Hawaii the submarines were to return to San Diego.

The cruises of all three branches of military defense provided excellent training in long range maneuvers. The flights are intended to show the importance of airplanes in the defense of the far flung territories of the United States and will probably aid in securing bigger appropriations for the aerial branches of both Army and Navy.

Adopt Special Insignia

For the flight the Army fliers adopted a special insignia which was painted on each ship and worn on the leather coats of the officers. It is a thunderbird with wings outstretched superimposed on a map of Alaska.

After reaching Fairbanks, Lieut. Col. Arnold and his planes made several flights over the Alaskan wastes to study the topography of the country and photograph possible airport sites for the Army Air Corps. The fliers also conducted tests to increase the military knowledge of the far-off territory.

On the basis of this important data government officials will probably decide on the location of military bases. Results of the cruises of the three units will be used in planning possible battle fleet maneuvers in Alaskan waters next spring.

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FOR INVENTORS And Mechanical Minded Men

How TO OBTAIN A

Answers to Questions

on Page 33

1. By patenting the invention.
2. Send sketch or model and description with search fee to a registered patent attorney.
3. 1101 U. S.—1279 Foreign.
4. Abraham Lincoln.
5. 17 years.
6. It confers on patentee the exclusive right to make, sell and use the invention covered by the patent.
7. No. Pencil sketch and description will usually suffice.
8. A form on which an inventor may execute his sketch and description. When properly filled out it is documentary evidence of your conception of the invention.
9. Because a layman or a lawyer in general practice is not learned in patent office practice.
10. As soon as patent application covering the invention is filed in United States Patent Office and official receipt received.

CLARENCE A. O'BRIEN
Registered Patent Attorney
317-L Adams Building
Washington, D. C.

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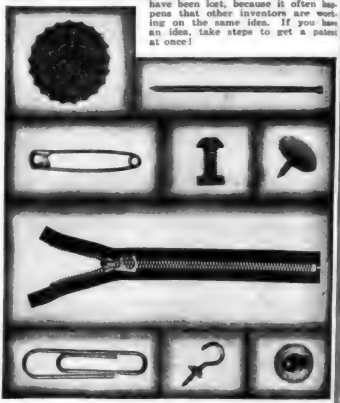
Small Ideas May Have Large Commercial Possibilities

If you hope to realize profits from your invention, you must protect it with a United States Government Patent. Otherwise you may find that all your time and labor have been lost, because it often happens that other inventors are working on the same idea. If you have an idea, take steps to get a patent at once!



THE Free Book shown here was prepared for inventors, to show them exactly what steps they must take to secure a PATENT. If you have an idea, you should send for this book AT ONCE. It will tell you exactly how an application for a Patent is made, what information you must furnish your attorney, and what steps he must take in order to protect your interests. Remember, inventing an article is one thing—securing the exclusive right to manufacture it, use it or sell it is another. Without a U. S. Patent, you cannot expect to reap the profits that your invention may make possible. Send at once for this book. After you get that, you'll know exactly what to do to protect yourself.

PATENT

KNOW HOW to START
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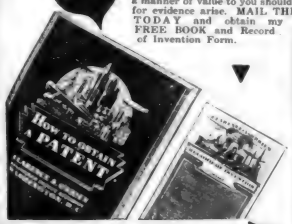

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Mystery of Islander's Vanished Gold

(Continued from page 56)

Cries of "Iceberg!" carried through the doomed vessel as men fought their way to the lifeboats. Riches were forgotten in the mad scramble for life. Tiny boats soon dotted the dark waters as men sculled furiously to avoid the undertow as the proud *Islander*, with a hissing of steam, sank into the glacial depths off Taku inlet.

Since that ill-fated night, six salvage attempts—all fruitless—have been made to raise the broken hulk from its resting place, 365 feet below the dark waters of Stephens Passage. But the curse which is said to guard dead men's gold has thwarted every effort. Today three men are serving terms in a federal prison because of the lure of the *Islander's* sunken gold. Embarking upon salvage operations, they found their store of capital inadequate, staged a robbery of the Seattle postoffice, were trapped by authorities and in 1932 were sentenced to terms ranging from 3 to 15 years in prison.

Project Headed by Ace Salvage Man

The organization which finally succeeded in raising the *Islander* began work in the summer of 1933 after a stock-selling campaign had netted a working capital of $500,000. At the head of operations was Frank Curtis, one of the ace salvage men of the west coast.

The great depth at which the *Islander* lay had balked previous salvage attempts; but with the use of a special diving apparatus capable of withstanding the sea's pressure, Curtis was able to send his men below and direct the operations of the salvage ship. The first task was to pass steel cables under the broken hulk—no small feat in itself—but finally, after countless failures, the job was done. Twenty heavy steel cables, attached to forty lifting winches, girdled the *Islander* and the laborious job of warping her toward shore was begun.

The project was without a parallel in the history of salvage operations. Weighing about 1800 tons, the *Islander* strained the salvage ship, *Griffson*, to the utmost. Cables snapped like package cord, endangering the lives of workmen. Powerful lift winches broke under the terrific load. Men's nerves snapped under the strain; but by October, 1933, appreciable progress had been made toward shore. Winter storms delayed the work but in the spring of 1934 another salvage ship, the *Forest Pride*, came to the *Griffson's* aid.

Tides Used to Raise Ship

Cradling the sunken ship between the two vessels, Curtis utilized the movement of the tides to nudge the *Islander* shoreward. At low tide slack was taken up on the cables and the winches set for the lifts on the rising tide.

Gradually the *Islander* rose higher in the water, moving toward the sanctuary of the beach. And with each yard of laborious progress toward Admiralty Island, fresh hopes of recovering the golden treasure rose in the breasts of Frank Curtis and his men.

(Continued on page 144)

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Scoops That Made Newsreel History

(Continued from page 132)

gasoline. Fernstrom finally got to the Bremen after, as he says, he "flew through vegetable soup." On the return trip his ship was forced down at an outpost where a plane had never landed before. In landing, one of the three bolts on the motor support broke, but even that did not stop them flying their films in to score a scoop.

Newsreeling as we know it today was introduced in the United States in 1910. In April of that year Pathe introduced the "Pathe Weekly." It was immediately popular here. Within the next three years there were a number of other weeklies introduced; among them the International News Weekly from which grew the Fox Movietone News and the Hearst Metrotone News; and the Universal Weekly which is the Universal Newsreel of today.

Newsreels continued through the passing years with consistent popularity. With the introduction of sound, many new problems were presented. Anything that made noise was considered news, and to get that, heavy equipment in the way of sound apparatus and cameras had to be carried. Sound made the newsreel into small productions; each reel having about nine different subjects.

The first sound newsreel may be said to date from January 21, 1927, when a short subject was released in sound in conjunction with "What Price Glory." It was a Fox Movietone reel featuring Raquel Meller singing a cycle of songs.

(Continued on page 144)

Fortunes in Needed Inventions

(Continued from page 75)

rich overnight. The device must function in such a way that no damage will result to the mail pouches.

A method of protecting the heater windings of electric coffee percolators is needed. These devices all have fuses which are more or less difficult to replace and there is needed a simple switch or highly simplified circuit breaker that will perform the same function.

There is a need for a more sanitary bird cage, one having a concealed roll of paper so that the housewife need only pull out a fresh strip to replace the bottom piece.

Manufacturers of hot air furnaces probably would welcome a device that will absolutely prevent dust from coming up hot air registers.

The motor manufacturers are looking for a simple and inexpensive air conditioning system for automobiles. The anti-draft device is just the first step.

Several million Americans who would rather take a shower than a tub bath would be interested in some sort of a shower apparatus that could be used in a bath tub *without curtains*.

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Photo courtesy Burlington R. R.

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Mystery of Islander's Vanished Gold

(Continued from page 140)

At last success crowned their efforts. In the latter part of July, of this year, the *Islander* was finally freed from the icy waters and was beached on Admiralty Island. She was a sorry sight. Her bow was shattered, her decks crushed, her funnels toppled over. But the long battle had been won. Men and machines had triumphed—had forced the sea to give up its prey.

Eagerly Curtis and his men swarmed over the barnacled hulk and into the sludge-coated interior. Anxiously they pried into every nook and cranny. Slowly jubilation gave way to blank amazement. For their initial search was fruitless. Not a trace of the golden fortune reputed to have gone down with the doomed ship was to be found.

What had happened to the *Islander's* golden cargo? Had the safes slid forward into the sea when the terrific crash tore away the liner's bow? Had the panic-stricken passengers cached their wealth in secret hiding places as they sought to escape? Or was it possible, as the purser indicated, that there was no store of gold aboard—that the returning miners had disposed of their dust and nuggets in Dawson before boarding the ship which was to carry almost half their company to their deaths? Or does Curtis and his company hold the secret of the *Islander's* treasure? Could it be that they have removed the gold secretly to avoid attacks by underworld characters or the questioning curiosity of thousands of interested persons?

Possibly further search may reveal the fate of the vanished gold and clear up the mystery of the crash which sealed the *Islander's* doom. According to reports, there was no fog, no ice, when the *Islander* plunged into the depths. What is the real story of that fateful night—the true account of the much-publicized treasure the ship is said to have carried? Perhaps only the dark waters of Stephens Passage know the answer.

Scoops That Made Newsreel History

(Continued from page 142)

The newsers' common enemy is he who interferes with their pictures; his personal enemy is the opposition reel. To get by a patrol man the cameramen will get together and start a nearby rumpus. When the officer investigates, they all sneak past the lines, but once the photographing starts each man is strictly on his own. In much less than two hours their pictures will be on the screen.

As an instance of the surprisingly short time in which finished pictures may be seen, a veteran newsreeler recalls the time when General Pershing returned to New York City, after the Armistice. He and his parade were photographed at the Battery. A short time later, when the marchers reached 42nd Street and Broadway, General Pershing could have stepped into the theatre there and seen a newsreel picture of himself starting out at the Battery.

Electric Telegraph Set

BOYS! A private Electric Telegraph Set of your own for **15c.** Lots of fun sending messages to your friends. Better still get two sets, hook them up as shown in the directions, for TWO-WAY MESSAGES (sending and receiving). No trouble at all to operate with the simple instructions that accompany each set. Operates on any standard dry battery obtainable everywhere. With this outfit you can learn to transmit and receive messages in the Morse International Code, and in a very short time become an expert operator. Mounted on wooden base measuring 4 x 3 in., first class construction throughout, complete with key, sounder, magnet, miniature Western Union blanks, packed in neat box with full illustrated instructions — ALL FOR 15c (without Battery) OUR BIG catalog of novelties, jokes, puzzles, tricks, etc., 10c.

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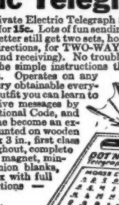

The Boy Electrician 10c

Add 20c for 64 page book "Electrical Wonders Revealed" telling how to make batteries, dynamos, motors, radios, telegraph apparatus, telephones, electric bells, alarms, trick electric devices. PRICE 20c postpaid.

BLANK CARTRIDGE PISTOL

REVOLVER STYLE

25c 50c $1.00

Three new models now out **25c, 50c and $1.00.** Well made and effective. Modelled on pattern of latest type of Revolver. Appearance alone enough to scare a burglar. Takes 22 Cal. Blank Cartridges obtainable everywhere. Great protection against burglars, tramps, dogs. Have it lying around without the danger attached to other revolvers. Fine for 4th July, New Years, for stage work, starting pistol, etc. **SMALL SIZE 4 in. long 25c. MEDIUM SIZE 8 in. long 50c. LARGE SIZE 8in. long $1.00. BLANK CARTRIDGES 50c per 100. HOLSTER (Cowboy type) 50c. Shipped by Express only not prepaid.** *Big catalog of other pistols, sporting goods, etc., 10c*

FRENCH PHOTO RING

Here is a very great novelty in Rings, that is selling in thousands. It is a highly made ring, finished in imitation platinum, and set with a large imitation diamond. It looks just like an ordinary ring, but in the shank of the ring is a small microscopic picture almost invisible to the naked eye, yet is magnified to an almost incredible degree and with astonishing clearness. There is quite an assortment of pictures that you can select, suits. Some are pictures of bathing girl beauties, pretty French actresses, etc., others are views of places of interest in France, Panama Canal and elsewhere; others show the Lord's Prayer in type, every word of which can be read by those with good eyesight. They are interesting without being in any way objectionable. **PRICE 25c, 3 for 65c, or $2.25 per doz, postpaid.** *Big Novelty Catalog 10c.*

BOYS! THROW YOUR VOICE

Into a trunk, under the bed or anywhere. Lots of fun fooling teacher, policeman or friends.

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a little instrument, fits in the mouth out of sight, used with above for Bird Calls, etc. Anyone can use it. Sounds A 16-page course on Ventriloquism together with the Ventrilo. All for 10c postpaid.

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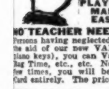

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Horned Toads — most interesting pets. Head, back and sides armed with long, horny spikes. Although of apparently ugly, grotesque nature, when in search of food it runs like lightning. Watch it pounce upon flies. Amusement by the hour. No trouble at all to keep. Feed it on meal worms or let it seek its own food. Will live for years and years. Shipped by mail to any address in U. S. A. or Canada for **50 cents.**

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Get one of these most wonderful of all creatures. Watch it change its color. Study its habits. Wear one on the lapel of your coat as a curiosity. Watch it shoot out its tongue as it catches flies and insects for food. No trouble to keep. Can go for months without food. Measures about 4 inches in length. Shipped to any address in U. S. A. by mail. We guarantee safe arrival and live delivery. **PRICE 25c, POSTPAID.**

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New INVENTIONS Speed BUSINESS Tempo

A remote control cash drawer locks by electricity when a holdup threatens. Contents are safeguarded since drawer cannot be opened by those in immediate vicinity.

Line drying reels for fishermen may be mounted on the casting rod, permitting line to be wound from casting reel to drying reel with a minimum of effort, for easy drying.

A new Christmas tree light does not affect other lights in the string when it burns out, thus saving time in replacing. The light has a burning life of five hundred hours.

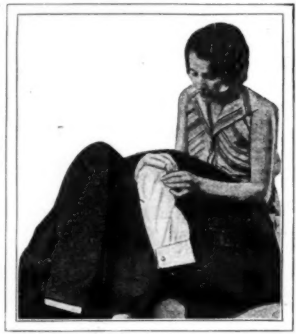
Photo shows device which registers both the temperature and humidity of room at a glance.

Gearless lawn mowers, driven by belt-power transmission operate in silence further enhanced by the fact that the blades do not strike the cutter bar.

An automatic shoe shining machine, electrically operated, shines shoes in less than two minutes without employing human aid.

Small lighting plants, generating standard 110 volt AC current, may be operated 7 hours on a gallon of gasoline. Full automatic control may be had which starts and stops the plant according to the load.

Featured by a recessed top, this small electric refrigerator offers additional storage space. Note compact size.



False shirt sleeves attached near the elbow inside the coat sleeve permit the wearing of sport-length sleeves while at the office, yet preserve a neat street appearance.

Aluminum paint which is said not to stiffen canvas or other fabrics has been developed for awnings, tents and similar material.

An anti-starling weapon, designed to prevent pollution of cornices and window ledges, is a new compound whose odor is offensive to birds, but not to humans.

Note protruding element which makes even pipe-lighting easy.

A low-priced tire groover using a 150-watt heating element is said to be hotter and faster than any groover heretofore offered.

A non-splitting tennis racket has a frame made of strong aluminum alloy tubing. The racket is light and will not warp.

A new drafting tool combines ten instruments —triangles of various degrees, protractor, compass, French curve and lettering guides.

Editor's Note—Addresses of manufacturers of these and other new products in this issue can be obtained by sending stamped, addressed envelope to MODERN MECHANIX AND INVENTIONS. *Manufacturers are invited to submit photos and literature for this page.*

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But *freshness* is only a part of Eveready's superiority. Inside the zinc case, there's a patented Eveready "power-stabilizer." It holds a balanced mix of the six active chemicals in perfect alignment ... ready to light instantly. While outside, sealing in freshness and power, there's a spun metal top.

Back of the "Date-Line" which guarantees Eveready *freshness* there's work ... and lots of it. But it's work that pays us ... and you, too ... for it brings you the comforting knowledge that in buying an Eveready for your flashlight, radio, or motor ignition you're buying packaged electricity at its *freshest* and best.

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At Times Like These You're Glad They're Fresh. Discovering an intruder in her home, Mrs. Peter Bradbury* turned a flashlight on his face. The intruder escaped ... but her family was safe. **Not her real name, but her real name was given in the newspapers.*

At Times Like These You're Glad They're Fresh. Johnny might be a great helper. But there are painful results from stepping on the garden rake. Play safe ... use your Eveready.

Your dealer will show you the

"DATE-LINE"

EVEREADY BATTERIES *packaged electricity at its best*

"I HAD A BERTH in the ninth sleeper. It was a heavy train and a cold night — snowing — and I thought about the man with his hand on the throttle. I admire and respect those men."

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